# The Dynamic Interplay of Attachment and Temperament in Relation to Dimensions of Aggression

by

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A thesis
Submitted in partial fulfilment
Of the requirements for the degree
Master of Arts

Department of Psychology
BROCK UNIVERSITY
St. Catharines, Ontario

December 2014

## Abstract

The current study examined whether overt and relational forms of reactive and proactive aggression were differentially related to adolescents' temperament and attachment security. Measures of adolescents' temperament, attachment security, and aggression were completed by 211 adolescents, ages 10–14, and their caregivers. Attachment security was consistently associated with all four dimensions of aggression, whereas proneness to frustration was found to be uniquely associated with reactive-overt aggression. Additionally, it was found that at lower levels of effortful control more secure attachment was related to lower levels of reactive-relational aggression. Results also indicated that, for girls, the relation between attachment and proactive-overt and proactive-relational aggression was only significant when effortful control was low. Conversely, for boys, the relation between attachment and proactive-overt aggression and proactive-relational aggression was significant when effortful control was high. Implications of these findings and limitations to the current study are discussed.

Acknowledgements

Foremost, I would like to offer my sincere gratitude to my supervisor, Dr. Drew Dane, whose expertise, understanding, and guidance, added considerably to my graduate experience. Thank you for always making time after a heavy research conversation to engage in one more lighthearted in nature. Your friendly and open approach was much appreciated during the heavy times of stress and helped me to keep good life balance in mind.

Secondly, I would like to thank my committee members, Dr. Kathy Belicki, and Dr. Linda Rose-Krasnor, for their continued support and dedication through this process. Kathy, thank you for your words of wisdom and guidance both professionally as well as academically. Your positive attitude and friendly smile made the halls of Brock that much brighter. And to Linda, thank you for pushing me to both think about and integrate complex information in ways I had never before.

Finally, to my mother whose love and unending support helped get me through. Mom, no words can express how grateful I am for your unwavering confidence in me and commitment to help me achieve my goal. You have been both a source of support as well as an inspiration. I couldn't have done it without you. And to my father, thank you for instilling in me the value of hard work and helping me believe that I could accomplish whatever I set my mind to. No matter how many miles you were away, you always felt close.

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## Introduction

Aggressive and externalizing behaviour have been linked to a host of negative outcomes for the aggressor, such as substance abuse, delinquency, depression, peer rejection, criminal behaviour, unemployment, and marital problems (see Odgers et al., 2007, for a review). These aggressive acts have also lead to negative consequences for the victims, including difficulties regulating mood and anxiety (Nishina, Juvonen, & Witkow, 2005), psychosomatic symptoms (Gini & Pozzoli, 2009), as well as academic (Espinoza, Gonzales, & Fuligni, 2013), and health related issues (Knack, Jensen-Campbell, & Baum, 2011; see Juvonen & Graham, 2014, for a review). Aggression in children is of particular interest to researchers in the field of child psychology, as nearly 50% of all child psychological referrals are due to displays of aggressive behaviour (Nelson & Finch, 2000). Due to the costly outcomes of aggression, investigators have conducted a great amount of research to determine its origins and discover ways of changing the developmental pathways of those who have already begun to display aggression.

A wide range of etiological factors has been studied in regard to aggressive behaviour, including sociocultural factors such as neighbourhood community violence (Hammond & Yung, 1994), and classroom context (Kellam, Rebok, Ialongo, & Mayer, 1994); temperamental predispositions, including frustration or anger proneness, poor effortful control, and a lack of fear (Rothbart, 2011); parenting factors such as harsh discipline (Farrington & Hawkins, 1991), inconsistent discipline (Patterson & Forgatch, 1995), and parent-child attachment (Fearon, Bakermans-Kranenburg, van Ijzendoorn, Lapsley, & Roisman, 2010); peer experiences such as exposure to aggressive peers (Sinclair, Pettit, Harrist, Dodge, & Bates, 1994) and peer rejection (Pettit, Clawson, Dodge, & Bates, 1996); and psychological factors such as social-information-processing biases (Crick & Dodge, 1994).

The purpose of the present study was to gain further understanding of childhood aggression by investigating the unique relations of attachment and temperament to four dimensions of aggression. Presented next is a description of the four dimensions of aggression, how they are measured, and the constructs that are theoretically and empirically associated with these dimensions. This is followed by an overview of the attachment and temperament constructs and their unique relations to differentiated aggression. Finally, a description of how attachment and temperament may interact to inhibit or facilitate the four dimensions of aggression is discussed.

In the field of developmental psychology, it is recognized that most developmental outcomes are due to an interaction among multiple factors. For instance, the interplay between temperament and parent-child relationship variables, such as attachment, is a key component in many models of aggression (e.g., Dodge & Pettit, 2003). These theoretical interactions have also been empirically tested, with results providing evidence for the importance of measuring attachment, as well as temperamental characteristics, when studying childhood aggression (van Ijzendoorn & Bakermans-Kranenburg, 2012). Numerous parenting variables, including parental monitoring (Lahey et al., 2008), maternal sensitivity (van Ijzendoorn & Bakermans-Kranenburg, 2006), parental support (Carlo, Roesch, & Melby 1998), hostility or rejection (Lengua, 2008; Sentse, Veenstra, Lindenberg, Verhulst, & Ormel, 2009; Veenstra, Lindenberg, Oldehinkel, De Winter, & Ormel, 2006), harsh or physical discipline (Kimonis et al., 2006; Vitaro, Barker, Boivin, Brendgen, & Tremblay, 2006), and parent-child attachment (Bates & McFadyen-Ketchum, 2000; Burgess, Marshall, Rubin, & Fox, 2003) have been demonstrated to interact with various temperament variables in the prediction of externalizing behaviour, aggression, and conduct problems in children.

However, the vast majority of previous studies investigating the interplay of the parent child relationship and temperament in relation to aggression have used undifferentiated (general) measures of aggression that aggregate a wide range of maladaptive behaviours. Unfortunately, this limits our understanding of etiological pathways to these externalizing behaviours. For example, the aggression subscale of the Achenbach Child Behaviour Checklist (2001) is a commonly used measure in this research. It includes items tapping frequent arguing, cruelty, bullying or meanness to others, property destruction, disobedience, frequent fighting, temper tantrums, physical attacks against people, teasing, and problems getting along with peers.

Over the last several decades, there have been significant modifications in the literature surrounding the concept of aggression and how it is to be defined. For some time, researchers have recognized that it is challenging to come up with an appropriate global definition of the concept of aggression (Hartup, 2005). However, the most widely used definition of aggression is "an act intended to harm others..." (Berkowitz, 1993; Dodge, Coie, & Lynam, 2006). This definition allows a wide variety of behaviours, which have in common only the vague 'intention to harm', to be included under the term 'aggressive behaviour' (i.e., general aggression). This global definition is extremely broad insofar as it fails to include the form of aggressive act, yet is overly specific in regard to the intended goal/function the aggressor wishes to achieve. As a result of these definitional issues, researchers have struggled to distinguish aggression from some of the other forms of maladaptive behaviour, such as externalizing and antisocial behaviours (ASB). In an attempt to solve conceptual overlap and definitional issues, researchers (e.g., Marsee & Frick, 2007) have delved deeper into what constitutes aggression by breaking it down into its component parts. This has moved researchers away from studying aggression as a unified

concept to looking at a differentiated view of aggression, where aggression is broken down into forms and functions.

**Differentiated aggression**

Although there is no consensus on the issue, the majority of aggression researchers agree that aggression is a multidimensional construct, and thus should be broken down into its individual dimensions and studied systematically (i.e., differentiated aggression). This approach has been exhibited in the literature in which aggression has been partitioned into forms (e.g., overt and relational) and functions (e.g., proactive and reactive). This has created a paradigm shift in the study of aggression.

**Functions.** There is a rather large compilation of research that has examined the distinction between the two functions of aggression – reactive and proactive aggression. Reactive aggression has been described as "an angry response to provocation or threat" (Dodge, 1991, as cited in Marsee et al., 2011, p. 793). The frustration-anger theory has been used to describe the concept of reactive aggression, stating that it is the result of strong reactions to feeling frustrated or angry (Frick & Morris, 2004), in which the automatic reaction to the stimulus creating the anger-frustration involves inflicting harm in some form (Berkowitz, 1993). This type of aggressive response is said to happen immediately and impulsively (Berkowitz, 1993) without regard to specific goals or consequences of the action (Blair, 2010). Reactive aggression has also been associated with hostile attribution biases (part of social information processing theory), in which some children are more likely to behave aggressively because they have a tendency to attribute hostility to provocation (Crick & Dodge, 1996; Dodge & Coie, 1987). Berkowitz (1993) developed a theory of reactive aggression called the cognitive neoassociative theory, which brings together the frustration-anger theory and social information processing theory, by

including cognitive elements (e.g., scripts) and negative affect (e.g., frustration) as important determinants of reactive aggression.

In contrast, proactive aggression has been defined as an aggressive response "which is typically unprovoked and is often used for instrumental gain or dominance over others" (Dodge, 1991, as cited in Marsee et al., 2011, p.793). Social learning theory has been used to explain the development of proactive aggression. Bandura (1973; Bandura & Cervone, 1983) theorized that aggression continues because it is reinforced. In the case of proactive aggression, the aggressive act happens because of the anticipated rewards that may follow for the aggressor (Vitaro, Brendgen, & Barker, 2006). For instance, children high in proactive aggression have social information processing biases in which they evaluate the anticipated outcome of aggression more positively than do other children (Hubbard, McAuliffe, Morrow, & Romano, 2010), as well as having a decreased sensitivity to consequences (Fisher & Blair, 1998). This decreased sensitivity to consequences is especially apparent when a reward is primed (Barry, Frick, DeShazo, McCoy, & Loney, 2000). Therefore, when proactively aggressive individuals are presented with a situation that involves rewards and consequences, they engage in a biased cost-benefit analysis in which the rewards of aggression are amplified and the consequences are minimized. This type of aggression is said to be planned, deliberate, free of emotion, and does not happen as a result of frustration or immediate threat (Card & Little, 2006; Dodge & Coie, 1987). However, there are authors who disagree with this contention (e.g., Blair, 2010), stating that proactive aggression can be associated with emotionality, particularly frustration.

Further conceptual differentiation between proactive and reactive aggression stems from the notion that they are the product of different social experiences. Dodge (1991) postulated that reactive aggression develops from a punitive and unpredictable environment. Conversely, Dodge

(1991) believed that proactive aggression develops in controlling environments that promote aggression as a tool to achieve one's goals. For example, reactive aggression has been demonstrated to be related to hostile environments, in which children were exposed to abusive or inconsistent parents (Dodge, Lochman, Harnish, Bates, & Pettit, 1997). In contrast, proactive aggression has been shown to be associated with significant exposure to aggressive role models who use coercive tactics to promote their own self-interest (Dodge et al., 1997).

Additionally, according to a meta-analysis conducted by Card and Little (2006), the functions of aggression are also distinguished in terms of psychosocial adjustment. For instance, reactive aggression was significantly related to peer rejection, delinquency, low prosocial behaviour, emotional dysregulation, symptoms of ADHD, and peer victimization, over and above the effects of proactive aggression. Alternatively, proactive aggression was only associated with peer rejection and delinquency, after accounting for the effects of reactive aggression. Therefore, it was concluded that reactive aggression is more strongly associated with maladjustment, due to larger effect sizes, as well as relations with adverse developmental outcomes over and above that of proactive aggression.

Lastly, there have only been a couple of studies that have looked at gender differences between the functions of aggression, one concluding that boys are both more reactively and proactively aggressive (Little, Henrich, Jones, & Hawley, 2003) than are girls and the other citing no significant gender difference in the functions of aggression (Fite, Stauffacher, Ostrov, & Colder, 2008). Notably, in these studies, the form of the reactive and proactive aggression was not explicitly measured.

**Forms.** While some aggression researchers have studied the functions of aggression, others have focused their efforts on untangling the forms of aggression. Researchers studying the

forms of aggression have applied divergent labels/terms when describing how aggression is displayed. However, after an extensive examination of the literature, Little et al. (2003) argued that two separate forms of aggression can encompass the rest: overt and relational. Overt aggression has been described as a direct form of aggression and includes both physical and verbal behaviours that are enacted with the intent to hurt another individual (Coie & Dodge, 1998). Conversely, relational aggression is a more indirect form of aggression in which harm is inflicted by manipulating or damaging a person's relationships or reputation (Crick, 1996). For example, relational aggression may involve harming another individual's friendship or social network by excluding the individual from the peer group or spreading rumours (Cairns, Cairns, Neckerman, Ferguson, & Gariépy, 1989; Crick & Grotpeter, 1995; Feshbach, 1969). This form of aggression has been positively linked to social competence (Björkqvist, 1994) and requires a high level of social prominence (Cillessen & Mayeux, 2004).

In a meta-analysis, Card, Stucky, Sawalani, and Little (2008), found that overt aggression was related to externalizing problems, low frequency of prosocial behaviour and poor relations with peers, as well as problems with self-regulation, whereas relational aggression was associated with internalizing problems and higher ratings of prosocial behaviour. Additionally, results confirmed prior findings indicating that boys engage in direct, overt aggression more often than do girls, but that there is little gender difference with regard to relational aggression.

**Measuring differentiated aggression**

Despite increased acceptance of the concept of differentiated aggression, there are authors who disagree with this division. The distinction between the dichotomies of proactive and reactive aggression has created some controversy due to the high correlation (r's ranging from .40 to .90) between them (Card & Little, 2006; Polman, De Castro, Koops, van Boxtel, &

Merk, 2007). However, factor analyses consistently yield two distinct factors indicating that reactive and proactive aggression are indeed separate dimensions (Little et al., 2003). Furthermore, the two functions of aggression demonstrate differential relations to psychological adjustment, lending further support to the proposition that they are indeed distinct types (Hubbard et al., 2010). Similarly, with regard to the forms of aggression, the consistent empirical finding is that these constructs are highly correlated, yet distinct (Little et al., 2003).

Until recently, most measures of differentiated aggression have either focused on the forms of aggression or its functions (Little, et al., 2003). To counteract this problem, researchers have begun integrating the forms and functions, enabling them to be studied simultaneously. For example, Marsee and Frick (2007) created a new differentiated aggression measurement device (Peer Conflict Scale) that measures the forms of aggression embedded in the functions (e.g., reactive-overt, proactive-overt, reactive-relational, and proactive-relational). This permits a more explicit understanding of which form of aggression is being captured in a given item. For example, in Dodge and Coie's (1987) measure of aggression, the reactive aggression item "when this child has been teased or threatened, he or she gets angry easily and strikes back" does not give us a clear indication whether "striking back" is an overt form or a relational form of aggression. In contrast, Marsee et al.'s (2011) measure of aggression is more explicit about the form they are intending to measure. For example, the reactive-overt item "when someone makes me mad I throw things at them" (Marsee et al., 2011) clearly captures both the reactive function and the overt form of the aggressive act.

By simultaneously studying the forms and functions of aggression, researchers are able to establish a more comprehensive understanding of both the ways in which children aggress, as well as the purpose of the display of aggression (Marsee et al., 2011). In the current study I will

follow Marsee and colleagues' (2011) approach, in which the form remains embedded in the function. Specifically, I will assess overt and relational aggression embedded in both functions (e.g., reactive-overt, reactive-relational, proactive-overt, and proactive-relational).

To date, there have only been a handful of studies that have utilized this new approach to studying aggression, with the forms embedded in the functions (e.g., Bailey & Ostrov, 2008; Dane & Marini, 2014; Marsee & Frick, 2007; Marsee, Weems, & Taylor, 2008; Ostrov & Crick, 2007; Ostrov & Houston, 2008; Walcott, Upton, Bolen, & Brown, 2008). Differential associations with the four dimensions of aggression were examined in the aforementioned studies, such that, reactive-overt aggression was associated with hostile attribution biases, frustration, low effortful control, fearlessness, and impulsivity, whereas reactive-relational was associated with difficulties with emotion regulation, anger, anxiety, low effortful control, hostile attribution biases, and teacher conflict. Additionally, proactive-overt aggression was associated with superficial charm, sensation seeking, callous-unemotional traits, and fearlessness, whereas proactive-relational aggression was related to callous-unemotional traits, teacher conflict, and pathological personality traits.

To extend research on the interplay of parenting and temperament in the development of aggression, I will consider in the present study how attachment security and temperament interact in predicting the four dimensions of aggression varying in both form and function: reactive-overt, reactive-relational, proactive-overt, and proactive-relational aggression. Measuring aggression with the forms embedded in the functions is more congruent with what clinicians see in practice. Therefore, utilizing this approach to measuring aggression can help further inform intervention strategies, as well as developmental theory (Marsee & Frick, 2007).

I will study the interplay amongst these variables in a sample of early adolescents, in grades five through eight, as this is a critical period for understanding the development of different dimensions of aggressive behaviour. For instance, some researchers have suggested that overt aggression develops at a young age whereas relational aggression does not come into play until late childhood or early adolescence (Björkquist, 1994) due to the higher level of social intelligence it requires (Cillessen & Mayeux, 2004). Additionally, as young children age, their cognitive capacity also matures, thereby increasing their cognitive flexibility (Deák, 2003), which enables children to understand how their behaviour can serve different functions (Deák, 2003). For instance, as children cognitively mature they would be able to understand the difference between aggression used to relieve frustration resulting from provocation (i.e., reactive aggression; Dodge, 1991) and aggression used to dominate others (i.e., proactive aggression; Barker, Tremblay, Nagin, Vitaro, & Lacourse, 2006).

This is also a developmental period where certain kinds of proactive aggression peak, partly due to the increased intrasexual competition for romantic partners in youth entering puberty (Buss & Dedden, 1990). Finally, it has been found that children who display aggression at young ages are at an increased risk for future maladaptive outcomes compared to those who start in adolescence (Huesmann, Dubow, & Boxer, 2009), making this an important developmental period to study aggression. Given the increase in aggression with proactive functions and relational forms, and the diversified use of different forms and functions, this is an important developmental period in which to study differentiated aggression.

**Temperament**

Amongst the many risk factors that have been associated with general aggression, temperament is a central variable with extensive empirical evidence illustrating its association

with conduct problems (Dodge et al., 2006; Dodge & Pettit, 2003; Frick & Morris, 2004; Lahey, 2004). Additionally, child temperament is considered a fundamental risk factor in several models of aggressive behaviour (e.g., Berkowitz, 2012; DeWall, Anderson, & Bushman, 2011; Dodge & Pettit, 2003). Given the known association between temperament and undifferentiated aggression, researchers and clinicians would gain a more thorough understanding of children's behavioural difficulties by looking at temperament in relation to dimensions of differentiated aggression (Marsee & Frick, 2007; Xu, Farver, & Zhang, 2009).

**Defining Temperament.** There have been four major theoretical frameworks employed in the study of temperament; these were developed by Goldsmith, Buss and Plomin, Rothbart, and Thomas and Chess (as cited in Goldsmith et al., 1987). Although each have made significant contributions to the development of the temperament construct, Rothbart's theory will be the model of temperament that is delineated for the purpose of this paper given its developmental emphasis, as well as it being the most widely cited theory of temperament.

Temperament has been defined as, "constitutionally based individual differences in reactivity and self-regulation…" (Rothbart & Bates, 2006, p. 100). Reactivity refers to how easily individuals become aroused in their emotions, motor activity, and attention. Behaviourally, this can be observed by an individual's tendency to approach or back away from stressful or novel situations. In contrast, self-regulation refers to the processes that control reactivity, namely the processes of executive attention and effortful control (Rothbart, Sheese, Rueda, & Posner, 2011).

**Temperament dimensions.** Putnam, Ellis and Rothbart (2001) hold that the structure of temperament involves four dimensions: surgency, affiliativeness, effortful control (EC), and negative affect (NA). However, only EC and NA will be assessed in the current study due to

their established relationship to aggression (Dodge et al., 2006; Frick, Cornell, Barry, Bodin, & Dane, 2003; Little et al., 2003).

EC has been defined as, "the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors" (Rothbart & Bates, 2006, p. 129). It involves the regulation of attention and behaviour and is said to be relatively stable within individuals over time (Mischel, Shoda, & Peake, 1988). EC, particularly low levels, has been of primary interest to researchers because of its association with emotional (Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994) and social maladjustment (Eisenberg et al., 2003), which affects the ability to exhibit socially appropriate behaviour (Valiente et al., 2011). Additionally, the development of EC is of particular interest in studies examining aggression, since low EC is frequently associated with aggressive behaviour (Dodge et al., 2006).

Negative affect, which consists of frustration and fearlessness, is a key aspect of temperamental reactivity (Ellis & Rothbart, 2001). When experiencing frustration, people may distance themselves from the stimuli producing the negative emotion or shift their attention to something else, which is generally seen as a positive coping strategy (Rothbart, Ellis, & Posner, 2011). However, others are unable to deal effectively with frustration (i.e., low frustration tolerance) so they act out aggressively against the stimulus creating the frustration/anger (Hubbard et al., 2002). High levels of frustration have been associated with reactive aggression (Little et al., 2003), making it an important variable in the current study. Similarly, the emotion of fear can induce withdrawal, attack, or behavioural inhibition (Rothbart, 2011). Fearlessness has been positively associated with impulsivity and aggression, and negatively associated with empathy and guilt (Rothbart et al., 2011). Fearlessness (i.e., lack of fear) is of particular interest in this study since it has been associated with proactive aggression (Frick et al., 2003).

## Temperament and Aggression

There has been a plethora of research that has linked frustration and fear to both internalizing and externalizing behaviours; the consensus is that the emotions of fearlessness and frustration are more strongly linked to externalizing behaviour and conduct problems than internalizing behaviour (Eisenberg et al., 2005; Kagan & Snidman, 1991; Veenstra et al., 2006), while low EC predicts both internalizing and externalizing behaviours (Kochanska & Knaack, 2003).

## Temperament and differentiated aggression

**Functions.** Since the introduction of research on differentiated aggression, researchers have begun matching the temperament dimensions discussed above to the functions of aggression, proactive and reactive aggression. Frick and Morris (2004) speculated that there are differential pathways from temperament to the functions of aggression. These authors suggested that low EC would be related to reactive aggression due to poor emotion regulation strategies. Additionally, they believed that those who utilized proactive aggression would actually have high EC since the aggression is characterised by planful acts, although this hypothesis has had mixed support in empirical evaluations (Card & Little, 2006; Rathert, Fite, & Gaertner, 2011; Xu et al., 2009).

The potential differential pathways from temperament to the functions of aggression have been empirically tested. For example, Marsee and Frick (2007) found that high frustration is associated with reactive aggression. Additionally, it has been demonstrated that EC is negatively associated with reactive aggression (Rathert et al., 2011).

In contrast, proactive aggression is associated with temperamentally callous-unemotional (CU) traits (Frick et al., 2003). Youth with CU traits tend to have an absence of guilt, fail to

show empathy for others, are less sensitive to cues of punishment, and often score high on fearlessness (Frick et al., 2003). It has also been associated with sensation seeking and a blunted affective response (Xu et al., 2009). Therefore, from a temperamental standpoint, relatively fearless children are at greater risk of being proactively aggressive than children who are fearful, possibly because they may be emotionally unaffected by their actions, dismissive of the harmful impact of their actions on others, and fearless of the consequences of their actions. Although further research is needed, investigators are beginning to uncover the different temperamental characteristics of youth who engage in reactive and proactive aggression.

**Forms.** Overt aggression has been shown to be consistently positively related to a proneness to anger and frustration, as well as having a negative relationship with reactivity to fearful situations and EC (Terranova, Morris, & Boxer, 2008). Relational aggression has also been positively associated with frustration (Ojanen, Findley & Fuller, 2012). Many researchers have chosen to focus on gendered differences in which the form of aggression is displayed most frequently. With respect to gender differences, it has been found that boys tend to engage in more physical forms of aggression than do girls (Card et al., 2008; Crick & Grotpeter, 1995).

Dane and Marini (2014) found that reactive-relational aggression among adolescents was associated with frustration proneness, whereas reactive-overt aggression was negatively associated with EC and fearfulness. Although this study did not look at the proactive function of aggression, these findings suggest that assessing the forms and functions together unveils different relations than those observed when dichotomies of form and function are studied separately.

**Main effect hypotheses for Temperament**

Although previous researchers have examined the differential relations of temperament to the forms and functions of aggression, there are still significant gaps in the literature. For example, there is a scarcity of research that considers temperamental characteristics as predictors of differentiated aggression, in which both the form and function of aggression are considered simultaneously. Therefore, one purpose of the current research was to examine the association between temperament and the dimensions of aggression, with the functions of aggression embedded in a form, as measured by Marsee and Frick (2007). In light of previous theory and empirical research, I hypothesized that high frustration would be associated with reactive-overt aggression, as well as reactive-relational aggression. Additionally, I hypothesized that EC would be negatively associated with reactive-overt aggression, whereas fear would be negatively associated with proactive-overt aggression.

**Beyond temperament**

It is important to note that it is unlikely that temperament is the only force acting on aggressive outcomes. The researchers and theorists in the field of psychology have long noted that biology by itself does not fully explain human behaviour, and that we must take into account the influence of the environment. For instance, when temperamentally vulnerable youth are also exposed to harsh parenting practices, they are more likely to display aggressive behaviour (Xu et al., 2009). This finding illustrates that the relation of temperament to behavioural adjustment may be conditional upon the environment to which a child is exposed (see Kiff, Lengua, & Zalewski, 2011 for a review of interactions between temperament and parenting).

One aspect of a child's environment that has been found to be extremely important in the regulation of distress is the parent-child relationship (Rothbart et al., 2011). It is within this relationship that a child learns about the meaning of emotion and how it is to be displayed and

modulated. As mentioned above, numerous parenting variables have been demonstrated to interact with a child's temperament in relation to externalizing behaviours (see Kiff et al., 2011 for a review). Given the pivotal role of the parent-child relationship in shaping children's ability to self-regulate their behaviour, the attachment behavioural system is likely another significant factor that helps explain individual differences in children's aggression, due to the activation of the attachment system during emotionally charged events (Calkins & Leerkes, 2011). Continuous parent-child interaction supports the formation of parent-child attachment, which, in turn, helps regulate the reactivity the child brings into the relationship (Vaughn, Bost, & van Ijzendoorn, 2008). This has been empirically tested by Burgess and colleagues (2003), as well as Bates and McFadyen-Ketchum (2000), who both found a significant interaction between parent-child attachment and children's temperament in relation to externalizing behaviour and child adjustment.

## Attachment

**Attachment theory.** Attachment theory was developed by John Bowlby, who is the originator of the concept of attachment. Bowlby defined attachment as a "lasting psychological connectedness between human beings" (1969, p.194) and believed that attachment could best be understood in evolutionary terms. Evolutionarily speaking, it is adaptive for the caregiver to provide safety and security to the infant, thereby increasing the infant's chance of survival. For instance, a child can be sociable and exploratory when the attachment figure is nearby; however, when children perceive there is an imminent threat to their wellbeing, they seek comfort and physical proximity from the attachment figure, ensuring safety and increasing reproductive fitness (Fraley, 2002).

Over time this consistent pattern of responding between the caregiver and the child creates internal working models (IWM), which affect how the child will anticipate, interpret, and respond to interaction with others (Bowlby, 1973; McFadyen-Ketchum, Bates, Dodge, & Pettit, 1996). This IWM of attachment that a child forms with his/her caregiver is then the prototype for how future relationships are to be enacted (Bowlby, 1969; Grossmann, Grossmann, & Waters, 2005). The notion that these IWMs of attachment formed in infancy are stable over time is a major part of the attachment theory, and allows researchers to consider attachment security to be a relatively stable construct throughout the lifespan.

**Measuring attachment**. Although most children develop an IWM of attachment, not every child forms the same type of attachment to their caregivers. Those who form an attachment relationship characterized by insecurity are at risk for maladaptive developmental trajectories (Bowlby, 1988). Using a categorical approach to measure attachment creates four established patterns of attachment relationships: secure, insecure-avoidant, insecure ambivalent, and disorganized (Ranson & Urichuk, 2008). However, the categorical approach to attachment has been questioned by numerous attachment researchers, instead advancing the use of a dimensional measure of attachment (e.g., Cummings, 1990; Fraley & Spieker, 2003; Main, Kaplan, & Cassidy, 1985; Roisman et al., 2007). Measuring attachment security as a dimension leads to more powerful statistical tests, as well as facilitating certain analyses such as statistical interactions (Cummings, 1990). In the current study, I utilized the dimensional approach to measuring attachment that is advocated by Cummings (1990).

## Attachment and undifferentiated aggression

Children who have formed a secure attachment are said to have an IWM of themselves as worthy of love, and of the caregiver as responsive and loving (McFadyen-Ketchum et al.,

1996). In contrast, an attachment IWM of a parent-child relationship characterized by mistrust and anger (insecure attachment) fosters feelings of being unworthy of love, and the perception of others as untrustworthy (McFadyen-Ketchum et al., 1996). This belief that others are untrustworthy increases negative attributions about others' intentions (Greenberg, Speltz, & DeKlyen, 1993; Suess, Grossman, & Sroufe, 1992) and diminishes the likelihood that these children will seek social support to help overcome distressing situations (Florian, Mikulincer, & Bucholtz, 1995; Hazan & Shaver, 1987; Kobak & Sceery, 1988), making displays of aggression more likely (Greenberg et al., 1993). In 1969 Bowlby first posited, on theoretical grounds, the link between attachment and aggression. Since then, there have been many empirical studies assessing the connection of these two constructs. A recent meta-analysis conducted by Fearon and colleagues (2010) concluded that children with an attachment relationship characterized by insecurity are at an elevated risk for externalizing problems.

**Attachment and differentiated aggression**

**Functions.** The insecure attachment IWM drives a tendency to attribute hostility to others' actions (particularly in ambiguous situations), creating a propensity for aggressive responses that stem from anger (e.g., reactive aggression resulting from abusive parenting; Greenberg et al., 1993). Alternatively, an IWM associated with attachment insecurity may drive a tendency to gain control of a situation by producing disruptive behaviours in an attempt to regulate the relationship in question (i.e., proactive aggression resulting from coercive parenting; Greenberg et al., 1993). Even though Greenberg et al. (1993) proposed that attachment security, insecure attachment in particular, may be related differentially to the functions of aggression, little research has been conducted to provide evidence in support of this theory. However, Marcus and Kramer (2001) sought to determine the relation of attachment security to both

proactive and reactive aggression, and they found that lower attachment security was associated with both reactive and proactive aggression. Since this has been the only published study examining the link between attachment security and the different functions of aggression, no definite conclusions can be drawn on how attachment security may be differentially related to the functions of aggression.

**Forms.** There has been extensive research on the relationship between attachment security and the overt form of aggression. After Bowlby (1969) proposed the theoretical link between attachment security and aggression, many researchers have empirically supported this proposition, finding a significant positive relationship between overt aggression and parent-child relationships characterized by low security/insecurity (Bosmans, Braet, Van Leeuwen, & Beyers, 2006; Harachi et al., 2006; Troy & Sroufe, 1987), with this relationship being generally stronger for boys than for girls (Renken, Egeland, Marvinney, Mangelsdorf, & Sroufe, 1989).

Conversely, there is little research on the association between parent-child attachment and relational aggression (Michiels, Grietens, Onghena, & Kuppens, 2008). Casas and colleagues (2006) found a significant relationship between children's insecure attachment and relational aggression in preschool children. Additionally, van Zeeland (2005) found that girls with an insecure attachment were nine times more likely to engage in relational aggression than those with a secure attachment relationship (as cited in Michiels et al., 2008).

**Main effect hypotheses for Attachment**

In the current study I hypothesized that attachment security will be negatively related to proactive-overt, reactive-overt, proactive-relational and reactive-relational aggression, based on theory (i.e., Dodge, 1991; Greenberg et al., 1993) and the limited empirical findings that are available.

## Interaction of attachment and temperament

**Attachment *versus* temperament.** Attachment and temperament have often been referred to as rival theories that seek to explain socio-emotional development, with both theories boasting a wealth of research indicating its particular importance. The point of dissension was historically whether the regulation of affect is intrinsic in the child (temperament) or a result of the child's relationship with their caregiver (attachment; Vaughn et al., 1992).

There have been attempts to understand the overlap between temperament and attachment empirically by looking for signs of redundancy. For example, when attachment and temperament constructs were juxtaposed, it was concluded that the individual differences in attachment security (secure-insecure) cannot be explained by temperament, nor are attachment constructs sufficient to explain the individual differences in temperament (Kochanska, Aksan, & Carlson, 2005; Pauli-Pott, Haverkock, Pott, & Beckmann, 2007; Rydell, Bohlin, & Thorell, 2005). However, since both concepts include the expression of affect as a primary component, modest to moderate correlations between the two constructs are likely to be found (Vaughn et al., 2008).

Despite the plethora of evidence indicating direct effects for both temperament and attachment in predicting aggression, the developmental outcomes of children are now assumed to be better predicted by a combination of variables. That is to say, the effect of one variable (e.g., temperament) may be dependent on, or moderated by, another variable (e.g., attachment security). In the temperament and attachment literature it is normative to test their interactive effects on various developmental outcomes (Cassidy & Shaver, 2008). This has led researchers to study their interactive effects on outcomes, rather than debating the distinction between the two constructs.

**Attachment x temperament.** The connection between temperament and attachment is highlighted when thinking about the caregiving environment in particular. This environment supports the formation of parent-child attachment and, in turn, the attachment system slowly regulates the reactivity that the infant brings into the relationship (Vaughn et al., 2008).

For instance, in a secure attachment relationship between parent and child, there are expectations that emotion regulation will be managed by the caregiver (mainly in infancy and early childhood) or regulated through coping strategies learned in past parent-child interactions (Bowlby, 1988). This ongoing interaction helps develop children's knowledge of which strategies will work to decrease emotional arousal and which ones will not (Sroufe, 1995). Therefore, although temperament is seen as existing within a person, the behavioural expression and experience of temperament are influenced by the stimulation provided by the environment, such as the parent-child relationship.

More specifically, when looking at the temperamental characteristic of frustration, attachment security between a parent and child likely plays a main role in the child's ability to control the expression of frustration, since the attachment behaviour system becomes activated during emotionally-charged contexts (Calkins & Leerkes, 2011). Calkins and Fox (1992) found an interaction between reactivity to frustration and attachment security, whereby those with high reactivity to frustration who also had a secure attachment displayed normative levels of behavioural inhibition relative to those with high reactivity to frustration and an insecure attachment.

Likewise, despite effortful control having constitutional origins (according to temperament theory), children require external support in learning how to regulate their emotions and behaviour. Since the parent-child relationship is a child's primary learning environment, it

likely plays a role in the development of children's EC (Kopp, 1989). In support of this theory, Belsky, Bakermans-Kranenburg, and van Ijzendoorn (2007) found that a supportive parenting environment was associated with higher EC. The results of a study conducted by Kochanska, Philibert, and Barry (2009) reaffirm Belsky and colleagues' (2007) findings, concluding that for children who are emotionally reactive (i.e., high frustration or high fearlessness), an attachment relationship characterized by high security helps increase their ability to self-regulate (i.e., EC).

This evidence supports the proposition that parents teach their children how to properly control their emotion expression by efficiently responding to their children's emotions (Vaughn et al., 2008). Therefore, a child who struggles to control their emotions and behaviour would benefit from a parent-child relationship high in security. Based on theory and empirical evidence, temperamentally vulnerable children may become less emotionally reactive and better at self-regulating in the presence of a secure attachment relationship. Nonetheless, the uncertain nature of how these constructs relate to differentiated aggression requires future research.

**Effects of temperament x attachment on aggression**

**Undifferentiated aggression.** There have been a few studies that have looked at the interaction of temperament and attachment in predicting externalizing behaviour. For instance, a study conducted by Burgess and colleagues (2003) attempted to test the interaction of attachment and temperament in predicting psychological and behavioural functioning. The authors found direct effects for inhibited temperament and attachment on externalizing behaviours at 4 years of age. Additionally, results indicated that insecurely attached children had elevated externalizing scores, but the interaction of insecure-avoidant attachment and uninhibited temperament was associated with the highest externalizing scores, specifically higher aggression scores (Vaughn et al., 2008, p. 209). Similarly, Bates and McFadyen-Ketchum (2000) found that attachment

moderated the relationship between temperament and externalizing behaviour. Specifically, they found that the relation between temperamental resistance to control and externalizing behaviour was diminished when there was a secure attachment relationship between the parent and child (Bates & McFadyen-Ketchum, 2000).

**Differentiated aggression.** To my knowledge, there have been no studies that have investigated the effects of the interaction between temperament and attachment on differentiated aggression. Although there is a lack of empirical evidence on the effects of the aforementioned interaction on differentiated aggression, there is strong theoretical support for the proposition that attachment security could interact with temperament to exert a strong influence on differentiated aggression outcomes.

For instance, the frustration-aggression theory/cognitive neoassociation theory (Berkowitz, 1993) suggests that children with high frustration proneness and low EC would be at greater risk for both reactive-overt and reactive-relational aggression, with both theories contending that aggression is in part due to the heightened experience of negative affect. However, based on attachment theory, the risk of reactive-overt and reactive-relational aggression should be lower in an attachment relationship characterized by high security due to the enhanced ability to self-regulate (e.g., seek social support), as well as the lessened likelihood of attributing hostile attributions to others actions (related to IWM's; Greenberg et al., 1993; Suess et al., 1992).

In contrast, children who are temperamentally fearless are more likely to engage in proactive-overt aggression than those who display appropriately fearful responses when a situation calls for one, due to the behaviour being reinforced (social learning theory), as well as the tendency to attach greater weight to the rewards of aggression as opposed to the costs (social

information processing theory). Additionally, people with insecure attachments are more likely to objectify people (e.g., use people for gain with no regard for their welfare; Mikulincer & Shaver, 2011) and less likely to value relationships (Kochanska & Kim, 2012). This may further bias the cost-benefit analysis due to a decreased likelihood of considering the effects their actions have on their relationship with others. However, an attachment relationship characterized by security has high reward value, thereby increasing the costs associated with behaviour that is not met with parent approval (Kochanska, 2002) or behaviour that would damage valued relationships in general. The results of 2 longitudinal studies conducted by Kochanska, Aksan and Joy (2007) reinforce the aforementioned theoretical propositions, finding that fearless children show better behavioural regulation when they have a positive parent-child relationship.

**Hypotheses for interaction effects**

On the basis of the foregoing theory and empirical research, I hypothesized that attachment and temperament would interact in relation to the different dimensions of aggression. However, given theoretical and empirical differences in relations with attachment and temperament, I expected different attachment by temperament interactions to be significant for the various dimensions of aggression. Specifically, I hypothesized that attachment security would interact with both frustration and effortful control in relation to reactive-overt aggression, whereas only frustration would interact significantly with attachment in relation to reactive-relational aggression. Furthermore, I anticipated that attachment and fearfulness would interact in relation to proactive-overt aggression, but I predicted no significant temperament by attachment interactions in regard to proactive-relational aggression. Given that it is unclear from theory and previous research whether gender may interact with temperament and attachment in relation to the dimensions of aggression, the gender variable in this study was treated as

exploratory and thus no specific hypotheses regarding gender interactions were made. However, due to the previous findings of gender differences in the use of the forms of aggression, it is important to examine this variable as a possible moderator.

**Summary of Hypotheses**

The hypotheses for the current study are summarized below.

1. *Reactive-overt Aggression.*

I expected that…

1.1. Frustration would be positively associated with reactive-overt aggression.

1.2. EC would be negatively associated with reactive-overt aggression.

1.3. Attachment security would be negatively related to reactive-overt aggression.

1.4. There would be a significant interaction between attachment and frustration, such that attachment would be more strongly (inversely) related to reactive-overt aggression when frustration is high, and frustration would be more strongly associated to reactive-overt aggression when attachment security was low.

1.5. There would be a significant interaction between attachment and EC, with EC being more strongly (negatively) related to reactive-overt aggression when attachment security is low, and attachment security being more highly (inversely) associated with reactive-overt aggression when EC is low.

2. *Reactive-relational Aggression*

I expected that…

2.1. Frustration would be positively associated with reactive-relational aggression.

2.2. Attachment security would be negatively related to reactive-relational aggression.

2.3. There would be a significant interaction between attachment and frustration, such that attachment security would be more robustly (inversely) related to reactive-relational aggression when frustration was high, and frustration would be more strongly associated to reactive-relational aggression when attachment security was low.

3. *Proactive-overt Aggression*

I expected that…

3.1. Fear would be negatively associated with proactive-overt aggression.

3.2. Attachment security would be negatively related to proactive-overt aggression.

3.3. There would be a significant interaction between attachment and fear, such that attachment security would be more strongly (inversely) associated with proactive-overt aggression when fear was low, and that fear would be more highly (negatively) related to proactive-overt aggression when attachment security was low.

4. *Proactive-relational Aggression*

I expected that…

4.1. Attachment security would be negatively associated with proactive-relational aggression.

## Method

### Participants

The participants were recruited from a study investigating positive youth development that was undertaken in the Niagara region of southern Ontario, Canada. This project was approved by Brock University's research ethics board as well as the Niagara District School Board (NCDSB). Children and their parents were recruited via information sheets that were distributed by the research team to the participating schools. Data for the current research were obtained from the four participating schools in the NCDSB with students in grades 5 through 8

who had written consent to participate, as well as the parents of these students. Additionally, each parent participant met the inclusion criteria of being the primary caretaker of a student who was participating in the study. The active consent rate for the current study was 49%. The student sample consisted of 117 girls (55.5 %) and 94 boys (44.5 %) with a mean age of 11.7 years (*SD* = 1.16) and a range from 10-14 years. Additionally, 176 primary caretakers also completed a complimentary parent survey, with a mean age of 42.6 years (*SD* = 4.58). With respect to ethnicity, 73.2% of the students identified themselves and their families as Canadian, 10.6% as Italian, and 16.2% as composed of various ethnicities such as Portuguese, Aboriginal and Croatian. Marital status included 78% married, 11% divorced or separated, 6% remarried, 2.7% common law and 2.2% single. The highest level of education obtained by 43.9% of the primary caretakers was college, followed by university (27.8%), and high school (21.7%). The median household income was between $100,000 and $120,000 annually.

**Procedure**

Families who were enrolled in the four participating schools in the NCDSB were given questionnaires for both the student and the parent to fill out. The students completed, with parental permission, the Child and Family Development Survey (CFDS) during school hours. A team of five research assistants assisted in data collection by going into the NCDSB elementary schools to administer the surveys. Students in grades 7 and 8 completed the surveys independently over a period of 60 to 80 minutes, whereas a read-along method was utilized for students in grades 5 to 6 to address possible reading limitations. The read-along group completed the surveys in two 45 minute periods on two consecutive visits. Additionally, a package was sent to the home of all students in grades 5 to 8 that contained a letter of explanation about the study, the parent questionnaire, and a consent form, as well as a YMCA swim pass that served as an

incentive to fill out the questionnaire. The parents were instructed to complete and return the survey to the school in approximately three weeks.

**Measures**

**Demographics.** Students were asked to report on their age, sex, grade, family composition and ethnicity. The primary caregivers were asked to report on their family composition, relationship to the child completing the survey, age, marital status, ethnicity, primary language spoken in home, education level, household income, and main occupation.

**Aggression.** Child participants responded to the Peer Conflict Scale (PCS) created by Marsee and Frick (2007), which is a 40-item scale designed to measure four different types of aggression in youth. There are a total of 20 items assessing reactive aggression (10 reactive-overt and 10 reactive-relational), as well as 20 items measuring proactive aggression (10 proactive-overt and 10 proactive-relational). These items were rated on a four-point scale ranging from "not at all true" to "definitely true". Scores for each subscale were established by summing the items (range = 0-30). Examples of items include "when I am teased I hurt someone or break something" and "I start fights to get what I want" which are items included in the reactive-overt and proactive-overt scale respectively. Additionally, "I spread rumours and lies about others when they do something wrong to me" is an item in the reactive-relational scale, and "I deliberately exclude others from my group, even if they haven't done anything to me" is an example of an item from the proactive-relational scale. A reliability analysis of the dimensions of aggression revealed Cronbach's α ranged from .90 to .92, and from .79 to .89 in Marsee and collegues (2011) study.

**Temperament.** Temperament traits were assessed using the Early Adolescent Temperament Questionnaire Revised (EATQ-R; Ellis & Rothbart, 2001). The EATQ-R is designed to evaluate the characteristics of temperament that relate to self-regulation. Effortful

control (made up of the attentional activation and inhibitory control scales) was assessed by 10 items such as "when asked to do something, does it right away, even if s/he doesn't want to". Frustration was measured by 7 items such as "Gets irritated when s/he has to stop doing something that s/he is enjoying". Finally, fear was assessed by 6 items such as "Worries about getting into trouble". All questions were rated on a five-point scale ranging between "almost always untrue" to "almost always true" and were filled out by the children's parents. Wording of items were changed from the original scale to reflect the parents perspective rather than adolescents self-report. Internal consistency for the parent report ranged from .64 to .72 in the current study and from .65 to .86 in Ellis and Rothbart's (2001) study.

**Attachment.** Attachment to parents was assessed using the Inventory of Parent and Peer Attachment-Revised (IPPA-R). The IPPA was originally developed by Armsden and Greenberg (1987) for adults, but was later revised for use with children and early adolescents by Gullone & Robinson (2005). This revision consists of some items that have been reworded to make them developmentally appropriate for the current age group. Congruent with attachment theory, the IPPA-R was designed to measure attachment security, specifically with parents and peers. It is comprised of three subscales that measure trust, communication and alienation. In the current study, only the items assessing the relationship between the child and his/her parental figure were used. Therefore, the measure of the attachment relationship between the child and his/her parental figure was made up of 28 items scored on a 5-point likert scale from 1 "almost never or never true" to 5 "almost always or always true" and was completed via self-report from the children in the study. Examples include "my parents respect my opinions," "my parents don't understand my problems," and "I trust my parents". The scale has shown good internal consistency with Cronbach's alpha ranging from .78 to .82 (Gullone & Robinson, 2005), as well

as good convergent validity (Gullone & Robinson, 2005). In the current study, a reliability analysis revealed a Cronbach's α of .76. The IPPA-R was scored according to the criteria set out by Armsden and Greenberg, which consisted of summing the trust and communication scale and subtracting the alienation scale (see Armsden & Greenberg, 1987, for further details).

## Results

### Preliminary Analysis

The data was first screened for normality by investigating the skewness and kurtosis values, as well as looking at frequency plots. Additionally, missing data was examined and all the assumptions of regression analyses were tested. The following describes the analyses performed on the missing data and the diagnostics surrounding the assumptions of regression analyses.

### Missing data

Analyses involved examining missing data to determine whether there was a significant pattern of missingness. Missing data was found on several of the variables of interest in this study and was above the cutoff point of 3% at the variable level (Tabachnick & Fidell, 2001). Therefore, a missing values analysis was employed to determine if imputing the missing values was a viable option. A missing values analysis helps to determine whether missing data on one variable are systematically related to the scores on any of the other variables of interest (Cohen, Cohen, West & Aiken, 2013). If such a relationship exists, imputing missing data could bias the results (Cohen et al., 2013). For example, if children who had low security attachment relationships with their primary guardian tended to avoid answering questions regarding their aggression towards others, then replacing the missing values with estimated scores would bias the results concerning the relationship between those two variables. After running the missing

values analysis it was concluded, based on Little's MCAR test (Little, 1988), the data were missing completely at random. Therefore, the expectation–maximization (EM) procedure was used to fill in the missing data.

**Testing the Assumptions of Regression**

Regression diagnostics were conducted to confirm that the assumptions of regression were not violated. There were 10 univariate outliers that were identified when standardized scores were examined; scores with values greater than an absolute value of three were considered outliers (Cousineau & Chartier, 2010). The results of analyses run both before and after omitting the outliers revealed a similar pattern of results. Additionally, omitting the outliers may bias the results due to a loss in variance that may represent naturally occurring scores in the population (Cohen et al., 2013). Finally, the normality of the distributions containing the potential outliers remained relatively similar after omitting these cases. Due to the aforementioned reasons, all cases were retained.

Multivariate outliers were identified as cases with standardized residuals greater than three. However, because they all had Cook's D values less than one they were not considered to be influential outliers (Cohen et al., 2013). Therefore, these cases remained in the final analyses.

In order to assess the normality of the variables, histograms were visually inspected. Additionally, normality was assessed by examining measures of central tendency for each distribution; a minimal range between measures of central tendency is indicative of a more normal distribution. As a result, skewness and kurtosis statistics were examined for further clarification regarding normality for all four outcome variables. Skewness and kurtosis statistics were divided by the standard errors, which generated values greater than an absolute value of three (which is the conventional limit; Tabachnick & Fidell, 1996). Therefore, log10

transformations were conducted on all four outcome variables, after first adding a constant of 1 to all scores (Cohen et al., 2013). The results of the regression analyses did not change after the transformation; therefore, the untransformed variables were used.

Scatterplots of the regression standardized residuals versus standardized predicted residuals were inspected in order to assess homoscedasticity. These graphs revealed that the scores were not distributed evenly around the lines of best fit, which indicates a potential problem with homoscedasticity. However, upon examination of the independence of residuals, the Durbin Watson Statistic was between 1.5 and 2.5 (Cohen et al., 2013) for each analysis, leaving little concern for an increased chance of a type I error and thus lessening the concern about homoscedasticity.

In order to determine if multicollinearity was an issue, bivariate correlations were examined (see Table 1). Bivariate correlations between the temperament variables and the attachment variable were all weak and positive, with the exception of the relation between attachment and fear, which was weak and negative. Correlations among the temperament variables were all weak and negative, with the exception of frustration and fear which showed weak positive relations with each other. The weak correlations among predictors coupled with the high tolerance values in the regression analyses gave me reason to believe that mulicollinearity was not an issue.

**Correlations**

As expected, all four dimensions of aggression were inversely correlated with attachment (see Table 1). However, only reactive-overt aggression was significantly negatively associated with EC and positively related to frustration. No other significant correlations were found between the temperament variables and the dimensions of aggression.

Table 1

*Summary of Intercorrelations, Means, and Standard Deviations Between Study Variables*

| Variables | M(SD) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Gender | | _ | _ | _ | _ | _ | _ | _ | _ | _ |
| 2. Age | | .00 | _ | | | | | | | |
| 3. Effortful Control (g) | 20.62(3.03) | -.21** | .11 | _ | _ | _ | _ | _ | _ | _ |
| 4. Frustration (g) | 2.85(.71) | .04 | -.08 | -.34** | _ | _ | _ | _ | _ | _ |
| 5. Fear (g) | 2.86(.69) | -.14* | -.09 | -.20** | .09 | _ | _ | _ | _ | _ |
| 6. Attachment (y) | 6.10(2.13) | .04 | .10 | .10 | -.02 | .06 | _ | _ | _ | _ |
| 7. Reactive-Overt (y) | 3.45(5.30) | .17* | .06 | -.19** | .23** | -.07 | -.21** | _ | _ | _ |
| 8. Reactive-Relational (y) | 2.82(4.42) | -.03 | .14* | -.06 | .12 | -.07 | -.23** | .66** | _ | _ |
| 9. Proactive-Overt (y) | 1.79(3.80) | .07 | .13 | -.09 | .13 | -.09 | -.16* | .70** | .79** | _ |
| 10. Proactive-Relational (y) | 1.76(3.76) | .00 | .13 | -.06 | .11 | -.12 | -.18** | .64** | .86** | .89** |

*Note.* All correlations involving temperament variables were based on the report from the primary guardian while those for attachment and aggression dimensions were based on youth report; y = youth, g = guardian. Gender was coded as girls = 0 and boys = 1.
* p <.05 ** p <.01. (two-tailed)

Finally, the four aggression outcome variables were all moderately to highly positively correlated. This is consistent with previous research (Fite et al., 2008; Murray-Close & Ostrov, 2009), and was managed by running residualized regressions (explained below).

**Main Analyses**

Eight hierarchical multiple regressions were run to test the aforementioned hypotheses. All regressions included parent-rated temperament and child-rated attachment that were examined in relation to child-rated aggression, which helps to reduce shared method variance due to multiple informants being utilized. The regression sequence included gender being entered in the first step, followed by main effects such as temperament characteristics (i.e., fear, frustration, and effortful control), and attachment in the second step. Next, two-way interactions between attachment and temperament were entered on the third step. On the fourth step, interactions between gender and temperament and gender and attachment were entered. Finally, three-way interactions between temperament, attachment and gender were entered on the fifth step. This format was repeated for all four differentiated aggression outcomes (i.e., reactive-overt, reactive-relational, proactive-overt, and proactive-relational).

The other four regressions assessed residualized effects by first controlling for the opposing form and function of aggression. In these regressions the opposing form and function of aggression was entered on step one, alongside gender, with all other steps being identical to the raw score regressions. This allows us to test the effects of attachment and temperament on differentiated aggression; by removing the variance associated with other forms and functions of aggression, it becomes a more stringent test (Dane & Marini, 2014; Marsee & Frick, 2007; Ostrov & Crick, 2007). Additionally, controlling for opposing forms and functions of aggression helps to determine whether temperament and attachment increase the risk of aggressing using a

particular form and function of aggression, above and beyond the opposing form and function of aggression.

Simple slopes analyses were conducted in order to determine if any of the significant interactions that were identified in the aforementioned regressions had a slope that was significantly different from zero (Aiken & West, 1991).

**Hierarchical Regression Results**

Hierarchical regressions were run on the four differentiated aggression outcome variables and the results of these regressions are presented in four subsections below. Each subsection is focused on the data relating to one of the aggression dimensions starting with the main effects, followed by any significant interactions, and finally a simple slopes analysis for any previously identified significant interactions. Post hoc probing of significant interactions was done by creating new moderator variables. This was accomplished by manipulating the zero point to be one SD above or below the mean and then analyzing the effect these new moderator variables had on the relationship between the predictor and outcome variable in follow-up regressions (Holmbeck, 2002). The regression lines from the significant interaction were then plotted using post hoc regression equations involving the predictor values at one SD above the mean and one SD below the mean.

**Reactive-overt Aggression**

**Raw Scores.** As shown in Table 2, gender was significantly and negatively associated with reactive-overt aggression, $t(210) = 2.45$, $p < .05$, indicating that boys used reactive-overt aggression more frequently than did girls. Furthermore, controlling for gender, frustration had a significant, positive relation with reactive-overt aggression, $t(210) = 2.90$, $p < .01$, whereas the significant relation between attachment and reactive-overt aggression was in a negative direction,

Table 2

*Multiple Regression Predicting Reactive-Overt Aggression.*

| | Raw Scores | | | | Residual Scores | | | |
|---|---|---|---|---|---|---|---|---|
| | $R^2$ | $R^2\Delta$ | *B* | $sr^2$ | $R^2$ | $R^2\Delta$ | $\beta$ | $sr^2$ |
| Step 1 | .03 | | | | .43 | | | |
| Gen | | | .17* | .03 | | | .17** | .03 |
| PR | | | | | | | .64*** | .41 |
| Step 2 | .13 | .11 | | | .47 | .04 | | |
| Attach | | | -.20** | .04 | | | -.10 | .01 |
| Fear | | | -.07 | .00 | | | .01 | .00 |
| Frust | | | .20** | .04 | | | .14* | .02 |
| EC | | | -.08 | .01 | | | -.06 | .00 |
| Step 3 | .15 | .01 | | | .48 | .01 | | |
| Attach X Fear | | | -.00 | .00 | | | .02 | .00 |
| Attach X Frust | | | -.07 | .00 | | | -.08 | .01 |
| Attach X EC | | | .08 | .01 | | | .01 | .00 |
| Step 4 | .16 | .01 | | | .49 | .01 | | |
| Gen X Fear | | | -.14 | .01 | | | -.11 | .01 |
| Gen X Frust | | | -.07 | .00 | | | -.02 | .00 |
| Gen X EC | | | -.09 | .00 | | | -.10 | .00 |
| Gen X Attach | | | .07 | .00 | | | .09 | .00 |
| Step 5 | .18 | .01 | | | .49 | .00 | | |
| Attach X Fear X Gen | | | .10 | .01 | | | .05 | .00 |
| Attach X Frust X Gen | | | .04 | .00 | | | .02 | .00 |
| Attach X EC X Gen | | | -.07 | .00 | | | .07 | .00 |
| *F= 2.75, F= 11.79* | | | | | | | | |
| *Df (15, 195,) Df (16, 194)* | | | | | | | | |

*Note. N* = 211. Gen = gender; PO = proactive-overt; Attach = attachment; Frust = frustration; EC = effortful control. Gender is coded with females as 0 and males as 1.Results in the table are based on the centered score for each predictor.

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

$t(210) = -3.07$, $p < .01$. There were no significant interactions.

**Residualized scores.** As shown in Table 2, gender was significantly, negatively associated with reactive-overt aggression, $t(210) = 3.18$, $p < .01$, indicating that boys used reactive-overt aggression more frequently than did girls. Additionally, proactive-relational aggression had a significant, positive relation to reactive-overt aggression, $t(210) = 12.20$, $p < .001$. Furthermore, controlling for gender and the opposing form and function of aggression, frustration had a significant positive relation with reactive-overt aggression, $t(210) = 2.54$, $p < .05$. Finally, a negative relation between attachment security and reactive-overt aggression approached significance, $t(210) = -1.93$, $p = .055$. There were no significant interactions.

Therefore, the only difference between the results of the raw and residualized regression analyses was that attachment was no longer significantly related to reactive-overt aggression after controlling for the opposing form and function. The results are consistent with hypotheses which stated that frustration would be positively related to reactive-overt aggression and attachment would be negatively related to reactive-overt aggression. Contrary to prediction, EC was not significantly related to reactive-overt aggression as a main effect, nor was it involved in any interactions.

**Reactive-relational Aggression**

**Raw Scores.** As displayed in Table 3, after controlling for gender, attachment security was negatively associated with reactive-relational aggression, $t(210) = -3.15$, $p < .01$. Additionally, reactive-relational aggression was also predicted by a two-way interaction between attachment security and EC, over and above each of the main effect variables.

***Follow up of two-way interaction.*** Reactive-relational aggression was predicted by a two-way interaction between attachment security and EC, beyond the main effects of

Table 3

*Hierarchical Multiple Regression Predicting Reactive-Relational Aggression*

| | Raw Scores | | | | Residual Scores | | | |
|---|---|---|---|---|---|---|---|---|
| | $R^2$ | $R^2\Delta$ | *B* | $sr^2$ | $R^2$ | $R^2\Delta$ | $\beta$ | $sr^2$ |
| Step 1 | .00 | | | | .63 | | | |
| Gen | | | -.03 | .00 | | | -.08 | .01 |
| PO | | | | | | | .80*** | .63 |
| Step 2 | .07 | .07 | | | .64 | .01 | | |
| Attach | | | -.22** | .05 | | | -.10* | .01 |
| Fear | | | -.07 | .00 | | | .00 | .00 |
| Frust | | | .12 | .01 | | | .02 | .00 |
| EC | | | -.02 | .00 | | | .01 | .00 |
| Step 3 | .10 | .03 | | | .65 | .01 | | |
| Attach X Fear | | | -.08 | .01 | | | -.06 | .00 |
| Attach X Frust | | | .02 | .00 | | | .03 | .00 |
| Attach X EC | | | .16* | .02 | | | .08 | .01 |
| Step 4 | .11 | .01 | | | .65 | .00 | | |
| Gen X Fear | | | -.06 | .00 | | | -.02 | .00 |
| Gen X Frust | | | -.04 | .00 | | | .00 | .00 |
| Gen X EC | | | .04 | .00 | | | .05 | .00 |
| Gen X Attach | | | -.05 | .00 | | | .00 | .00 |
| Step 5 | .13 | .02 | | | .66 | .01 | | |
| Attach X Fear X Gen | | | .07 | .00 | | | -.06 | .00 |
| Attach X Frust X Gen | | | -.06 | .00 | | | -.07 | .00 |
| Attach X EC X Gen | | | -.17 | .01 | | | -.02 | .00 |
| *F= 1.90, F=23.14* | | | | | | | | |
| *Df (15, 195,) Df (16, 194)* | | | | | | | | |

*Note. N* = 211. Gen = gender; PO = proactive-overt; Attach = attachment; Frust = frustration; EC = effortful control. Gender is coded with females as 0 and males as 1. Results in the table are based on the centered score for each predictor.

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

temperament and attachment. Regression lines were graphed (see Figure 1) and show that the relationship between attachment and reactive-relational aggression was *only significant* at low levels of EC ($\beta = -.38$ $sr^2 = .06$, $p < .01$), as opposed to high levels of EC ($\beta = -.08$, $sr^2 = .00$, $p = .39$).

**Residualized Scores.** As displayed in Table 3, proactive-overt aggression was significantly, positively related to reactive-relational aggression, $t(210) = 18.78$, $p < .001$. Additionally, controlling for gender and proactive-overt aggression, attachment security was negatively associated with reactive-relational aggression, $t(210) = -2.25$, $p < .05$. No significant interactions were found.

In summary, attachment security was found to be negatively related to reactive-relational aggression in both the raw and residualized regression analyses. Conversely, the two-way interaction between EC and attachment was only significant in the raw regression analysis. The results surrounding attachments relation with reactive-relational aggression is consistent with hypotheses. Contrary to expectation, frustration was not significantly related to reactive-relational aggression as a main effect nor was it involved in an interaction effect. No hypothesis was made regarding a significant interaction between EC and attachment.

**Proactive-overt**

**Raw Scores.** As shown in Table 4, attachment security was significantly, negatively associated with proactive-overt aggression, $t(210) = -2.21$, $p < .05$, over and above the effects of gender. Additionally, proactive-overt aggression was also predicted by a three-way interaction between EC, attachment, and gender, $t(210) = -2.00$, $p < .05$.

***Follow-up of three-way interaction.*** A simple slopes analysis revealed a negative relationship between attachment and proactive-overt aggression, for girls, in which the

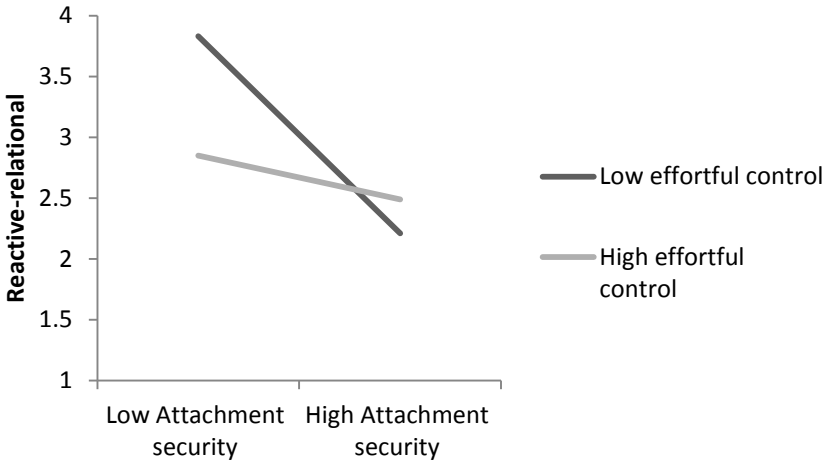


*Figure 1.* Effortful control (EC) interacting with attachment security to predict reactive-relational aggression.

Table 4

*Multiple Regression Predicting Proactive-Overt Aggression*

| | | | Raw Scores | | | | Residual Scores | |
|---|---|---|---|---|---|---|---|---|
| | $R^2$ | $R^2\Delta$ | $\beta$ | $sr^2$ | $R^2$ | $R^2\Delta$ | $\beta$ | $sr^2$ |
| Step 1 | .01 | | | | .63 | | | |
| Gen | | | .07 | | | | .09* | .01 |
| RR | | | | | | | .79** | .62 |
| Step 2 | .06 | .05 | | | .63 | .00 | | |
| Attach | | | -.15* | .02 | | | .02 | .00 |
| Fear | | | -.09 | .01 | | | -.03 | .00 |
| Frustration | | | .12 | .01 | | | .03 | .00 |
| EC | | | -.03 | .00 | | | -.02 | .00 |
| Step 3 | .07 | .01 | | | .64 | .00 | | |
| Attach X Fear | | | -.03 | .00 | | | .04 | .00 |
| Attach X Frust | | | -.02 | .00 | | | -.03 | .00 |
| Attach X EC | | | .11 | .01 | | | -.03 | .00 |
| Step 4 | .07 | .00 | | | .64 | .00 | | |
| Gen X Fear | | | -.05 | .00 | | | .00 | .00 |
| Gen X Frust | | | -.05 | .00 | | | -.02 | .00 |
| Gen X EC | | | .00 | .00 | | | -.04 | .00 |
| Gen X Attach | | | -.07 | .00 | | | -.03 | .00 |
| Step 5 | .12 | .04 | | | .65 | .02 | | |
| Attach X Fear X Gen | | | .16 | .02 | | | .11* | .01 |
| Attach X Frust X Gen | | | .02 | .00 | | | .06 | .00 |
| Attach X EC X Gen | | | -.20* | .02 | | | -.07 | .00 |
| *F=1.73, F= 22.73* | | | | | | | | |
| *Df (15, 195,) Df (16, 194)* | | | | | | | | |

*Note. N* = 211. Gen = gender; RR = reactive-relational; Attach = attachment; Frust = frustration; EC = effortful control; m = marginally significant. Gender is coded with females as 0 and males as 1. Results in the table are based on the centered score for each predictor.

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

attachment relation was *only significant* at low levels of EC (β = -.41 $sr^2$ = .03, $p$ < .01), as opposed to high levels of EC (β = .08, $sr^2$ = .00, $p$ = .49). This interaction is displayed in Figure 2. Conversely, as displayed in Figure 3, at low levels of EC for boys the relationship between attachment and proactive-overt aggression was not significant (β = -.17, $sr^2$ = .01, $p$ = .23); however, at high levels of EC the relationship was significant (β = -.42, $sr^2$ = .03, $p$ < .05).

**Residualized Scores.** As shown in Table 4, gender was significantly associated with proactive-overt aggression, $t(210) = 2.07$, $p < .05$, indicating that boys used proactive-overt aggression more frequently than did girls. Additionally, reactive-relational aggression was significantly associated with proactive-overt aggression, $t(210) = 18.78$, $p < .001$.

Furthermore, controlling for gender and reactive-relational aggression, proactive-overt aggression was also predicted by a three-way interaction between fear, attachment, and gender, $t(210) = 2.05$, $p < .05$.

***Follow-up of three way interaction.*** Post hoc probing of the three-way interaction between fear, attachment and gender, after controlling for opposing form and function of aggression, indicated that the simple slopes for attachment were no longer significant for boys at both high, $t(210) = -1.84$, $p = .07$, and low levels of fear, $t(210) = -1.65$, $p = .10$. Similarly, the simple slopes for attachment were no longer significant for girls at both high, $t(210) = 1.35$, $p = .18$, and low levels of fear, $t(210) = 1.52$, $p = .13$. Though non-significant in all cases, the direction of the effect was negative in the case of boy participants and positive in the case of girls, perhaps resulting in the significant interaction. This result is not interpreted or discussed further in this research, given the non-significance of the simple slopes.

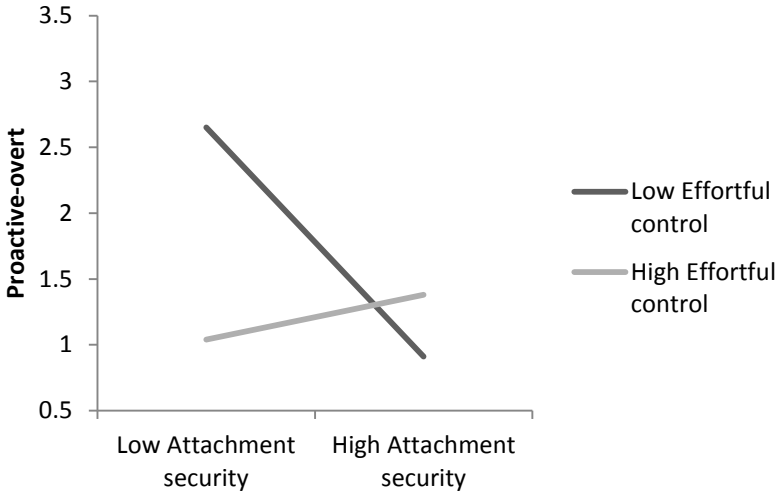


*Figure 2.* Effortful control (EC) interacting with attachment security to predict proactive-overt aggression for girls.

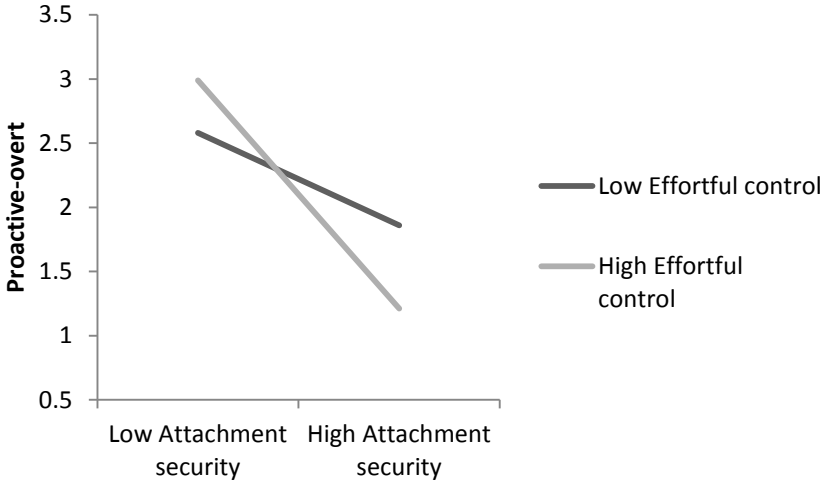


*Figure 3.* Effortful control (EC) interacting with attachment security to predict proactive-overt aggression for boys.

Differences were found between the results of the raw and residualized regressions. For instance, the raw regression analysis identified a significant (inverse) relationship between attachment and proactive-overt aggression, whereas this relation did not exist after controlling for the opposing form and function of aggression. Additionally a three-way interaction between EC, attachment, and gender was identified in the raw regression analysis, which was not found in the residualized regression. However, after controlling for the opposing form and function of aggression, a significant three-way interaction between fear, attachment, and gender emerged. Attachment's negative relation with proactive-overt aggression was consistent with hypotheses. Alternatively, contrary to hypotheses, there was no relation between fear and proactive-overt aggression. Although no formal hypotheses were made regarding the three-way interactions that were identified, EC was not expected to play a significant role in any interactions relating to proactive-overt aggression. Additionally, no significant interaction was found between fear and attachment, which is contrary to prediction.

**Proactive-Relational**

**Raw Scores.** As displayed in Table 5, attachment security is negatively related to proactive-relational aggression, $t(210) = -2.47$, $p < .05$. Additionally, beyond the main effects of temperament and attachment, proactive-relational aggression was predicted by a three-way interaction between EC, attachment, and gender, $t(210) = -2.22$, $p < .05$.

***Follow-up of three-way interaction.*** As displayed in Figure 4, the inverse relationship between attachment and proactive-relational aggression for girls was *only significant* at low levels of EC ($\beta = -.47$, $sr^2 = .04$, $p < .01$), as opposed to high levels of EC ($\beta = .05$, $sr^2 = .00$, $p = .65$). In contrast, as displayed in Figure 5, the relationship between attachment and proactive-

Table 5

*Multiple Regression Predicting Proactive-Relational Aggression*

| | Raw Scores | | | | Residual Scores | | | |
|---|---|---|---|---|---|---|---|---|
| | $R^2$ | $R^2\Delta$ | *B* | $sr^2$ | $R^2$ | $R^2\Delta$ | $\beta$ | $sr^2$ |
| Step 1 | .00 | | | | .42 | | | |
| Gen | | | .00 | .00 | | | -.11* | .01 |
| RO | | | | | | | .66*** | .42 |
| Step 2 | .06 | .06 | | | .43 | .01 | | |
| Attach | | | -.17* | .03 | | | -.04 | .00 |
| Fear | | | -.13 | .02 | | | -.09 | .01 |
| Frust | | | .10 | .01 | | | -.03 | .00 |
| EC | | | -.04 | .00 | | | .02 | .00 |
| Step 3 | .08 | .02 | | | .44 | .01 | | |
| Attach X Fear | | | -.04 | .00 | | | -.04 | .00 |
| Attach X Frust | | | .02 | .00 | | | .06 | .00 |
| Attach X EC | | | .12 | .01 | | | .06 | .00 |
| Step 4 | .08 | .01 | | | .44 | .01 | | |
| Gen X Fear | | | -.05 | .00 | | | .04 | .00 |
| Gen X Frust | | | -.08 | .00 | | | -.04 | .00 |
| Gen X EC | | | .01 | .00 | | | .07 | .00 |
| Gen X Attach | | | -.03 | .00 | | | -.08 | .00 |
| Step 5 | .12 | .04 | | | .46 | .02 | | |
| Attach X Fear X Gen | | | .11 | .01 | | | .04 | .00 |
| Attach X Frust X Gen | | | .03 | .00 | | | .01 | .00 |
| Attach X EC X Gen | | | -.22* | .02 | | | -.18* | .01 |
| *F= 1.78, F= 10.32* | | | | | | | | |
| *Df (15, 195,) Df (16, 194)* | | | | | | | | |

*Note. N* = 211. Gen = gender; RO = reactive-overt; Attach = attachment; Frust = frustration; EC = effortful control. Gender is coded with females as 0 and males as 1. Results in the table are based on the centered score for each predictor.

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

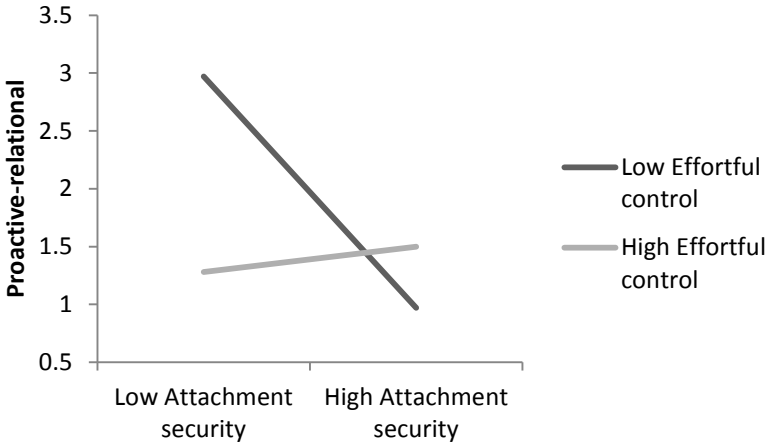


*Figure 4.* Effortful control (EC) interacting with attachment security to predict proactive-relational aggression for girls.

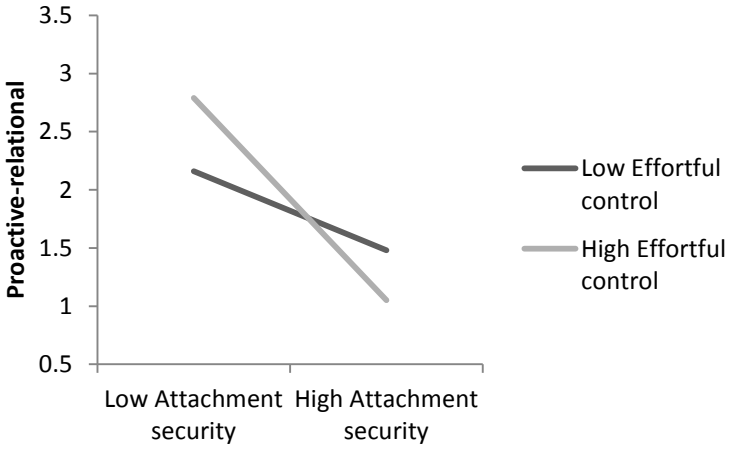


*Figure 5*. Effortful control (EC) interacting with attachment security to predict proactive-relational aggression for boys.

relational aggression, for boys, was non-significant at low levels of EC (β = -.16, $sr^2$ = .01, $p$ = .26) and significant at high levels of EC (β = -.41 $sr^2$ = .02, $p$ < .02).

**Residualized Scores.** As shown in Table 5, gender was significantly, negatively associated with proactive-relational aggression, $t(210) = -2.00$, $p < .05$, indicating that girls used proactive-relational aggression more frequently than did boys. Additionally, reactive-overt aggression was significantly associated with proactive-relational aggression, $t(210) = 12.20$, $p < .001$. Furthermore, beyond the main effects of temperament and attachment, proactive-relational aggression was also predicted by a three-way interaction between EC, attachment, and gender, $t(210) = -2.29$, $p < .05$.

***Follow-up of three-way interaction.*** Post hoc probing of the three-way interaction between EC, attachment, and gender, after controlling for opposing form and function of aggression, indicated that the simple slopes for attachment were no longer significant for girls at both high, $t(210) = 1.30$, $p = .20$, and low levels of EC, $t(210) = -1.62$, $p = .11$. Similarly, the simple slopes for attachment were no longer significant for boys at both high, $t(210) = -1.97$, $p = .06$, and low levels of EC, $t(210) = -.48$, $p = .63$. Although all simple slopes were non-significant, there was a variation in the direction of the effects of the simple slopes, which may perhaps explain the significant interaction that was found. However, this result is not interpreted or discussed further in this research, given the non-significance of the simple slopes.

In summary, the results of the raw regression analyses suggested that attachment was significantly, negatively related to proactive-relational aggression but not after controlling for the opposing form and function of aggression. Attachment's relation with proactive-relational aggression was consistent with hypotheses. Additionally, gender emerged as a significant factor relating to proactive-relational aggression in the residualized analyses but not the raw analyses.

Furthermore, the results of both the raw and residualized regression analyses indicated a significant three-way interaction between EC, attachment and gender. No formal hypotheses were made regarding the three-way interaction between EC, attachment, and gender due to gender's role being exploratory in nature. However, EC was not expected to play a significant role in any interactions relating to proactive-relational aggression.

## Discussion

The purpose of the present study was to gain an understanding of the dynamic interplay between attachment and temperament in predicting differentiated aggression in youth. More specifically, the purpose was to investigate the unique relations of attachment and temperament with subtypes of aggression. Consistent with hypothesized relations, there were significant interactions between temperament and attachment in relation to differentiated aggression. Additionally, I found that attachment generally had stronger and more consistent relations with the dimensions of aggression than did temperament, though these associations were often conditional on the participant's temperament, specifically effortful control. Finally, although there were no specific hypotheses regarding three-way interactions due to hypotheses about gender in this study being exploratory in nature, there were three significant three-way interactions found in this study.

### Reactive-overt Aggression

**Frustration.** As hypothesized, frustration was positively related to reactive-overt aggression. This relation was found for both raw and residualized scores. The association with residualized reactive-overt aggression suggests that proneness to frustration elevates the risk of responding specifically with overt aggression when provoked and experiencing negative affect, above and beyond the opposing form and function of aggression. Frustration was not associated

with any other dimension of aggression; therefore in this sample it is a risk factor that is uniquely associated with reactive-overt aggression.

The link between frustration and reactive-overt aggression is consistent with the cognitive-neoassociative theory (Berkowitz, 1993), which, as previously mentioned, states that reactive aggression occurs when someone experiences frustration and anger (negative affect) in response to provocation. According to this theory, there is an increased probability of aggressive cognitions and aggressive behaviour when frustration is experienced, which results in an automatic response intended to inflict harm upon the stimulus creating the frustration (Berkowitz, 1993; Berkowitz, 2012). This finding also coincides with previous research that has linked high levels of frustration to reactive aggression (Little et al., 2003; Marsee & Frick, 2007) and overt aggression (Terranova et al., 2008). However, the results of this study extend previous research by demonstrating that this relation exists with a measure that is explicit in stating the form of reactive aggression (overt) that is being measured. As previously discussed, many alternative measures of aggression are not specific in stating both the form (e.g., overt) and function (e.g., reactive) of aggression that is being measured, which leaves it up to the interpretation of the reader. The present results illustrate the importance of specifying the forms of reactive aggression, as frustration is uniquely related to reactive-overt but not reactive-relational aggression.

**Effortful Control (EC).** Contrary to predicted relations, EC was not associated with reactive-overt aggression. Although the zero-order correlation between EC and reactive-overt aggression was significant, it was not related to reactive-overt aggression above and beyond the effects of gender, attachment and frustration. The significant overlap between frustration and EC (as evidenced by the zero-order correlations) may explain the lack of a significant independent

relation between EC and reactive-overt aggression. In light of the significant negative zero-order correlation between EC and frustration, being easily frustrated implies, to a certain extent, a lack of EC. Similarly, higher levels of EC could also reduce the tendency to become easily frustrated.

However, given the significant independent relation of frustration with reactive-overt aggression, despite the aforementioned overlap, it seems as though frustration is a more salient risk factor for reactive-overt aggression.

**Attachment.** Consistent with hypotheses, attachment was negatively associated with the raw measure of reactive-overt aggression, independent of temperament. This result is in line with attachment theory (Bowlby, 1969), which indicates that insecurely attached individuals often have difficulty with emotion regulation, as well as the cognitive-neoassociative theory of aggression (Berkowitz, 1993), insofar as emotion regulation difficulties would likely increase the experiences of negative affect that predispose people to reactive aggression. This finding is also in line with previous research in which high attachment security is associated with decreased levels of generalized aggression (Fearon et al., 2010; Greenberg et al., 1993; Suess et al., 1992). However, previous research was not specific in terms of the form and function of aggression being measured and tended towards measuring generalized aggression; therefore, the present study is in agreement with and extends the findings of previous research.

However, attachment was not associated with the residualized measure of reactive-overt aggression, which suggests that although attachment insecurity is associated with higher levels of reactive-overt aggression, it is not linked specifically to an increased likelihood of being overtly aggressive in circumstances involving provocation, above and beyond the opposing form and function of aggression. Additionally, contrary to hypotheses, attachment did not interact with EC in relation to reactive-overt aggression. It was theorized that self-regulation deficits due to

attachment insecurity, such as poor emotion regulation skills and a reluctance to seek social support, would amplify the risk of reacting to a situation by becoming overtly aggressive, especially when there are established temperamental deficits in self-regulation. Therefore, given that this relationship was not significant, there was no evidence in the present study that the risk of reactive-overt aggression, due to temperamental deficits in self-regulation, is amplified by self-regulation deficits due to attachment insecurity.

To date, there is a significant gap in research examining how attachment is related to aggression in which the forms are embedded in the functions. As discussed further below, the current study addresses this gap by demonstrating that attachment insecurity is differentially associated with overt and relational forms of reactive aggression.

**Reactive-relational aggression**

**Frustration.** Contrary to expectation, frustration was not associated with reactive-relational aggression. In the current study, a tendency towards frustration was only associated with overtly aggressive responses to provocations involving the generation of negative affect. This suggests that the negative-affect related mechanisms discussed in the cognitive neoassociative model may vary depending on the form of reactive aggression. This result is contrary to the findings of Ojanen and colleagues (2012), as well as Dane and Marini (2014), who found a positive relationship between relational aggression and frustration, as well as reactive-relational aggression and frustration, respectively. The difference in results could be due to the different measures used to assess the aggression dimensions. The measure used in the current study was designed to make the items more explicit in terms of the form it was intending to measure, as well as to expand on alternative reasons for aggression. For instance, one of the criticisms of the aggression measure used in the Dane and Marini (2014) study is that the items

are narrowly worded (Marsee et al., 2011). The scale used in the present study is broader insofar as it includes items that capture aggression for dominance, aggression for sadistic reasons, unprovoked aggression, and thoughtless aggression, whereas Little et al.'s (2003) measure tends to focus on aggression for gain and aggression as a result of anger. Therefore, some of the items used in the Marsee scale may not map onto the frustration construct as directly as they do in Little et al.'s scale.

**Attachment.** As predicted, attachment was found to be related to both raw and residualized reactive-relational aggression. This result is consistent with attachment theory, which suggests that insecure attachment increases the likelihood of attributing hostile attributions to others' actions (Greenberg et al., 1993; Suess et al., 1992) leading to feelings of anger/frustration due to IWM's that are characterised by a mistrust of others intentions (McFadyen-Ketchum et al., 1996). Insecure attachment also leads to difficulties with the self-regulation of emotions, which, together with hostile attributions, may increase the risk of engaging in retaliatory aggression.

A key difference from findings regarding reactive-overt aggression is that attachment was related to residualized reactive-relational aggression, which suggests that attachment insecurity is associated with an elevated risk of using aggression specifically to retaliate by damaging the relationships and reputations of those who provoked the aggressor, above and beyond the use of opposing form and function. Perhaps because attachment guides perceptions and actions within social relationships via IWM's learned in the primary attachment relationship, someone with an insecure attachment may consequently be more likely to respond to being hurt or upset by manipulating someone's relationship. Therefore, engaging in the manipulation of social relationships may become a primed strategy when those with an insecure attachment are faced

with perceived provocation. However, the aforementioned main effect of attachment security on reactive-relational is qualified by the significant interaction between EC and attachment.

**EC x Attachment**. It was found that at lower levels of EC more secure attachment was related to lower levels of raw reactive-relational aggression, whereas at higher levels of EC, attachment was not significantly related to reactive-relational aggression. The significant relationship found between attachment and reactive-relational aggression at low levels of EC is consistent with expectations that having an insecure attachment and low EC would decrease one's ability to self-regulate during emotionally charged events, leading to increased risk of engaging in retaliatory aggression. In contrast, the ability to regulate negative emotion as well as displaying openness to seeking social or emotional support, both of which develop within a secure attachment relationship, may offset self-regulation difficulties due to low EC, thereby lessening the likelihood of acting out aggressively. The guardians of securely attached children may be more likely to have used rearing techniques that taught children to regulate their reactions to emotional events (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996). To explain further, securely attached children with low EC may compensate for their temperamental vulnerabilities by use of learned self-regulation skills, as well as utilizing support from others, which are both products of a secure attachment. A child with low EC who has been raised in an environment with consistent, daily interactions that promote self-regulation may fare better in the face of emotional stimuli.

Moreover, those children with secure attachments will presumably have acquired IWMs which predispose them to trust the intentions of others during social interactions, making them less likely to infer hostility. Conversely, children with less secure attachment may be more likely to interpret behaviours of others as hostile and may therefore be more reactive during such

interactions. Similarly, Burgess and colleagues (2003) found that children who had an insecure attachment to their parents and who struggled to regulate or inhibit behaviour were more likely to display externalizing problems at a later age.

However, this finding is somewhat inconsistent with previous research showing that EC can both inhibit and facilitate reactive-relational aggression. For instance, Dane and Marini (2014) found that there was a stronger link between frustration and reactive-relational aggression when EC was high. Additionally, Murray and Kochanska (2002) also found that both low and high EC were significantly related to higher scores on the problem behaviour scale on the Child Behaviour Checklist (CBCL). Perhaps the discrepancy in findings arises from the different aggression measures used; the CBCL does not consider forms and functions of aggression, and the Little et al. (2003) instrument used by Dane et al (2014) operationalizes reactive-relational aggression using somewhat different items compared to those included in the Marsee et al. (2011) measure employed in the present study. Specifically, Marsee and Frick (2007) took issue with the preponderance of items measuring aggression stemming from anger. Marsee and Frick believed that the functions or goals of the aggressive acts included in their measure should be more diverse, including aggression that is premeditated, aggression for dominance, and aggression that is thoughtless.

**Proactive-overt aggression**

**Attachment.** The zero-order correlation between attachment and proactive-overt aggression, as well as the significant unique effect in the raw regression analysis, are consistent with attachment theory and empirical research (e.g., Mikulincer & Shaver, 2011) demonstrating that people with insecure attachments are more likely to objectify people (e.g., use people for gain with no regard for their welfare) and less likely to value relationships (Kochanska & Kim,

2012). In other words, they would be less likely to factor the welfare of others into their cost-benefit analyses of proactive aggression, which means that they may be more likely to use proactive aggression if it is beneficial for their own self-interest. This is consistent with the results of study by Marcus and Kramer (2001), which demonstrated that insecure attachment was associated with proactive, as well as reactive aggression. However, in the present study the main effect of attachment security on proactive-overt aggression is qualified by the significant three-way interaction between EC, attachment, and gender.

**EC x Attachment x Gender.** Results indicated that, for girls, the relationship between attachment and proactive-overt aggression was only significant when EC was low. Conversely, there was a significant relation between attachment and proactive-overt aggression among boys with high effortful control. Therefore, it seems that girls are at greater risk for proactive-overt aggression when attachment security and EC are low, whereas boys are at risk when attachment security is low but EC is high.

The relation between attachment and proactive-overt aggression for girls with low EC may be interpreted in light of Xu et al.'s (2009) finding that sensation seeking is more strongly associated with proactive aggression when EC is low. This seems to suggest that low EC may affect the regulation of goal-directed behaviour that is driven by reward and the positive emotions that result. The items in the Peer conflict scale used in the present study speak to proactive-overt aggression being used for various reasons such as sadistic pleasure, instrumental gain, and to increase social resources such as popularity, power and respect. Thus, low EC may impair the self-regulation that is required to inhibit the use of proactive-overt aggression to pursue these various rewards and sources of pleasure and excitement.

Additionally, cost-benefit analyses about the use of proactive aggression may be further biased in favour of utilizing proactive-overt aggression when someone who has low EC also has an insecure attachment. Since insecure attachment has been associated with the objectification of others (Mikulincer & Shaver, 2011) and low EC reduces the ability to self-regulate, the cost-benefit analyses may be significantly skewed in favour of using proactive-overt aggression to gain rewards and experience positive affect, while maintaining little regard for the consequences their actions have on others.

One possible explanation for why low EC facilitates proactive-overt aggression for girls whereas high EC facilitates this relationship for boys, in the context of an insecure attachment, is how adaptive the aggressive behaviour is for both genders. For instance, engaging in overt aggression is non-normative for female children and adolescents. Crick, Bigbee and Howes (1996) found that girls who engaged in this form of aggression experienced higher levels of social-psychological maladjustment and more sanctions from their female peers due to the use of this form of aggression being met with disapproval. Therefore, the cost-benefit analyses concerning whether or not it would be advantageous to engage in a gender non-normative form of aggression would be tipped in favour of inhibiting this behaviour, given the substantial costs.

However, girls with low EC and an insecure attachment may have difficulty inhibiting this behaviour due to their struggle to self-regulate, as well as their lack of concern for the welfare or approval of others. In other words, girls with insecure attachments and low EC (who engage in a non-normative form of aggression) may be less likely to care about the negative responses from peers because they put less value in their relationships with others (Mikulincer & Shaver, 2011), while also having difficulties in regulating reward oriented positive affect (Xu et al., 2009). Both of these factors make it less likely they will inhibit their aggressive response.

Conversely, for boys, engaging in aggression with a proactive function has been considered an adaptive strategy as it increases their ability to attain resources, mates, and dominance relative to other peers (Volk, Camilleri, Dane, & Marini, 2012). Additionally, when boys do engage in aggression they are more likely to utilize overt forms of aggression than are girls (Card et al., 2008). Given the adaptive outcomes that engaging in aggression affords boys, having the ability to self-regulate (i.e., high EC) may not act as a deterrent to engage in proactive-overt aggression, since the rewards of engaging in aggression may outweigh the costs. Furthermore, boys who have an insecure attachment are less likely to factor in the consequences of their actions on others due to an increased objectification of others (Mikulincer & Shaver, 2011), as well as the decreased value that is placed on relationships (Kochanska & Kim, 2012), both of which further minimize the costs associated with engaging in proactive-overt aggression. Therefore, since boys in general have more to gain by engaging in proactive-overt aggression due to the adaptive benefits, boys with insecure attachment and high EC may be more likely to engage in proactive-overt aggression than those with low EC. The decreased reward value on relationships, the tendency towards objectifying others, and the ability to consider the pros and cons to their behaviour, all of which are more likely with youth possessing insecure attachments and low EC, may amplify the rewards of engaging in the aggressive act and minimize the costs.

**Proactive-relational Aggression**

**EC x Attachment x Gender.** It was found in the current study that, for girls, there was a significant relation between attachment and proactive-relational aggression when EC was low. Conversely, attachment security played a significant role in determining engagement in proactive-relational aggression at high levels of EC for boys. These results suggest that girls with low EC and low attachment security are more likely to engage in proactive-relational aggression

whereas for boys, high EC and low attachment security were associated with an increased risk of engaging in proactive-relational aggression. This is consistent with the findings regarding proactive-overt aggression, where low attachment security may increase the risk of proactive-relational aggression for girls with low EC and for boys with high EC.

For boys, high levels of EC may help them more successfully execute proactive-relational aggression due to the planning and high level of social competence required (Björkquist, 1994). This is in accord with Dane and Marini (2014) who also found that emotionally reactive adolescents were more likely to engage in relational aggression when EC levels were high, suggesting that behavioral inhibition may enable more thorough planning, which could facilitate proactively aggressive behaviour. Therefore, the ability to self-regulate (i.e., high EC) may not deter engagement in proactive-relational aggression, but may instead increase the risk due to continued positive reinforcement that comes from the successful implementation of well thought out strategies. Furthermore, boys who have an insecure attachment are less likely to factor in the consequences of their actions on others due an increased objectification of others (Mikulincer & Shaver, 2011). People with insecure attachment also tend to place decreased reward value on relationships (Kochanska & Kim, 2012). Both of these social-cognitive processes would minimize the social costs of engaging in aggressive behaviour, and therefore further bias the cost-benefit analysis in favour of engaging in proactive-relational aggression. Therefore, the aforementioned adaptive benefits derived from boys engaging in proactive-relational aggression, coupled with a decreased reward value placed on relationships and the tendency towards objectifying others (derived from insecure attachment) increases the risk of boys engaging in proactive-relational aggression. Additionally, the ability to create and implement a successful plan (derived from having high EC) further increases the

likelihood of choosing to engage in proactive-relational aggression due to the heightened reward value that results from a successful aggressive act.

However, with respect to the finding regarding girls, it is somewhat surprising that the combination of insecure attachment and low EC would increase the risk of engaging in this subtype of aggression, given that some aspects of relational aggression require social competence and social status to implement (e.g., persuading others to socially exclude a peer; Björkquist, 1994), as well as proactive aggression requiring the ability to plan (Card & Little, 2006; Dodge & Coie, 1987). However, the aggression questionnaire used in the present study does not ask whether the proactive-relational aggression acts were carried out effectively, which may be affected by someone's ability to self-regulate. Therefore, although high EC may help with devising and executing a successful plan for relational aggression, it could be that those with low EC are still using this strategy, just not as successfully. Additionally, some acts of relational aggression may require more social competence and planning than others. For example, whereas social exclusion may require skilled persuasion and patience, ignoring someone or spreading rumours may not involve the same level of social competence.

Additionally, gender differences in the *manifestation* of proactive-relational aggression may partially explain the difference in the moderating role of EC between boys and girls. For instance, girls tend to use relational aggression primarily in intrasexual competition as a tool against romantic rivals (Buss & Dedden, 1990). Secondly, there are differences between boys and girls in terms of what they tend to derogate. Females tend to derogate other females' physical appearance, fidelity, or promiscuity (Buss & Dedden, 1990), whereas males tend to derogate physical prowess, achievements, and social status (Buss & Dedden, 1990). Although

this does not fully explain the differing role of EC between boys and girls, it does shed light on possible gender differences in relational aggression that may be salient.

**Overall Conclusions**

This research has contributed new information to our understanding of the correlates associated with differentiated aggression in which both form and function is considered. Results supported the conception that temperament alone does not impact the development of aggression, but interacts with the child's attachment security to heighten or reduce aggression.

Consistent with expectations, attachment security, as part of main effects or interaction effects, was consistently associated with all four dimensions of aggression. Therefore, a secure attachment to a caregiver may decrease the use of aggressive tactics regardless of the subtype of aggression, which is consistent with theory (Greenberg et al., 1993) as well as previous research (Marcus & Kramer, 2001). Although a secure attachment relationship may work to decrease all four aggression dimensions, it may involve different mechanisms depending on the function of aggression (Greenberg et al., 1993). For instance, a secure attachment relationship helps to establish healthy IWMs of social relationships that may help the child self-regulate (McFadyen-Ketchum et al., 1996) as well as increase support seeking (Florian et al., 1995), which may help reduce reactive aggression. Conversely, in the case of proactive aggression, a secure attachment relationship may act to increase the reward value of relationships or minimize the objectification of others (Mikulincer & Shaver, 2011), which in turn may counteract a biased cost-benefit analysis (Kochanska, 2002).

With regard to temperament, proneness to frustration was uniquely associated with reactive-overt aggression, which is consistent with the cognitive-neoassociative theory (Berkowitz, 1993), as well as previous research (Little et al., 2003; Marsee & Frick, 2007;

Terranova et al., 2008). Additionally, although there was no main effect found for EC, the moderate zero-order correlation between EC and frustration suggests that being high in frustration implies a somewhat lower degree of effortful control. Furthermore, only frustration in relation to reactive-overt, and attachment security in association with reactive-relational aggression, were significantly associated with residualized aggression scores. Therefore, these were the only variables that specifically increased the likelihood of aggression involving a particular form and function, after controlling for the opposing form and function of aggression.

Additionally, the finding regarding reactive-relational aggression supported the expectation that the combination of low EC and low attachment security would decrease the ability to self-regulate and thus increase the risk of reactive-relational aggression. However, with regard to both proactive-overt and proactive-relational aggression, there were unexpected findings indicating differential moderating roles of EC in analyses of boys and girls. In regard to girls, the inability to regulate goal directed behaviour (i.e., low EC) coupled with insecure attachment was associated with an increased likelihood of engaging in proactive-overt and proactive-relational aggression. Conversely, for boys, the ability to regulate goal directed behaviour (ie., high EC) coupled with insecure attachment increased the likelihood of engaging in proactive-overt and proactive-relational aggression. This may be due to gender differences in the use of overt and relational forms of proactive aggression. Specifically, engaging in proactive-overt aggression is likely more adaptive for boys compared to girls. Furthermore, proactive-relational strategies may manifest differently for boys than girls, as there is a tendency to derogate different qualities in male rivals relative to the aspects that are the focus of female relational aggression.

However, for both genders, those with an insecure attachment are less likely to factor in the consequences of their actions on others due to an increased objectification of others (Mikulincer & Shaver, 2011), as well as the decreased value that is placed on relationships (Kochanska & Kim, 2012), both of which further minimize the costs associated with engaging in proactive forms aggression. Therefore, having a secure attachment relationship may act as a buffer against proactive types of aggression for those who struggle to regulate their behaviour, as well as for those who are proficient at self-regulating.

Given the differential links between the dimensions of aggression and the attachment and temperament variables, this research further demonstrates the validity of using an aggression measure that assesses the dimensions of aggression. Despite the inherent overlap between the dimensions of aggression, examining them reveals unique associations that remain hidden when aggression is measured as a unitary construct.

Moving beyond the implications for research purposes, the results of this study may also help to inform interventions aimed at reducing aggression by providing more nuanced information about what contributing factors play a role in each specific subtype of aggression. For instance, since attachment was associated with all four dimensions of aggression, attachment-focused interventions, such as attachment-focused family therapy (Becker-Weidman & Hughes, 2008) may be broadly applicable to behavioural difficulties consistent with the various dimensions of aggression. Alternatively, as reactive-overt aggression alone was uniquely associated with a predisposition to frustration, the use of anger-control therapies for behavioural problems of this nature (e.g., John Lochman anger coping program; Lochman, Dunn, & Klimes-Dougan, 1993) may be advisable.

**Strengths and Limitations.**

There are a number of strengths in the current study. For instance, both raw and residualized regressions were run to address the concern in the literature that the forms and functions of aggression are moderately correlated (Card & Little, 2006; Hubbard et al., 2010; Little et al., 2003). By controlling for the opposing form and function of aggression in the first step, it allows researchers to minimize common variance shared amongst the different subtypes. This generates an aggression score that indicates the propensity to aggress in a particular form with a particular function or goal, above and beyond the opposing form and function of aggression. Conversely, some researchers do not agree with controlling for common variance and argue that it removes meaningful common variance relating to general aggressive tendencies (Spector, Zapf, Chen, & Frese, 2000). Since the current study runs the regressions with and without controlling for common aggression variance, both sets of results may be examined, giving a more complete picture of the relations that temperament and attachment have with the dimensions of aggression.

Another strength of the current study was the use of two informants: parent and child. Using multiple informants gives a more balanced perspective by reducing bias that comes from utilizing one perspective (Kurdek, 2003). By utilizing different informants for the predictor variables, we were able to decrease the shared method variance, making the analyses more stringent.

Finally, another strength of the current study relates to how aggression was measured. Measuring aggression with the form embedded in the function (e.g., reactive-overt) makes it more closely linked to what clinicians see in practice. For instance, in "real world" situations, aggression is displayed as a form embedded in a function. Measuring aggression the way it would typically be seen in a real world context enables practitioners to glean important

information from research to inform their practice. Additionally, breaking down aggression into subtypes, rather than studying it as a unified whole, allows for a more nuanced look at childhood aggression that can help inform possible differentiation of services or treatment strategies.

Along with the strengths of the current study, there are also limitations. For instance, while the results help to further our understanding of differentiated aggression, the data is cross-sectional in nature and therefore is unable to address causal interpretations. Additionally, due to the use of cross-sectional data, the direction of effects is not able to be determined. For instance, it may be that less securely attached youth with temperamental risk factors (e.g., low EC) act more aggressively than their peers, or alternatively, it may be that adolescents have less secure attachments and are given to emotional reactivity (e.g., high levels of frustration) as a function of being aggressive individuals.

It has been long since noted that within parent-child relationships it is not advisable to assume that the parent is solely influencing the child (Dunn, 1997). Reciprocity and mutuality within the parent-child relationship is now generally assumed (Dunn, 1997) and has been supported empirically (Holden, Thompson, Zambarano, & Marshall, 1997; Manke & Plomin, 1997; O'Connor, Hetherington, & Clingempeel, 1997). Furthermore, within the temperament and attachment literature, it is common to test their interactive effects on developmental outcomes since both have been demonstrated to have influence on each other (Calkins & Fox, 1992; Calkins & Leerkes, 2011; Cassidy & Shaver, 2008; Fox, Kimmerly, & Shafer, 1991; Kochanska et al., 2009; Vaughn et al., 2008). Utilizing a longitudinal research design would help to uncover the direction of effects or transactional processes that underlie the attachment and temperament constructs. Specifically, utilizing a longitudinal research design that takes into account the role of developmental periods and level of analysis (Dunn, 1997), within a

framework that recognizes the dynamic nature of the interactions (Sameroff, 2009), would enable researchers to develop a more thorough understanding of the aforementioned constructs. Studying these interactive processes can assist in the creation and implementation of interventions that take into account the *active* role of children's temperamental characteristics as well as the parent-child attachment relationship in shaping children's future behaviour (Lengua & Kovacs, 2005).

Secondly, a relatively homogenous community sample was used for the current study, so results may not be generalizable to individuals in different cultural contexts. Additionally, due to the relatively low active consent rate, the sample may also not be representative of the school population as a whole. The research was conducted during a period of tense labour negotiations between teachers and the province, which may have contributed to the lower response rates due to a lower-than-usual level of enthusiasm from teachers with regard to facilitating the project. However, the active consent rate for the current study is consistent with the typical range of active consent rates in school-based research, which is about 40% to 65% (Bloom-Hoffman et al., 2009; Esbensen, Melde, Taylor, & Peterson, 2008; McMorris et al., 2004).

Finally, the effect sizes for the main effects were of small to moderate size. A possible reason for the relatively small effect sizes is that by utilizing parent report for temperament dimensions, child report for attachment, and youth report for aggression, relations are likely smaller than if they were rated by the same informant due to the absence of shared method variance. Additionally, these effect sizes are unique insofar as they are above and beyond all of the other variables that were controlled in the regression equation.

**Future Directions.**

In future studies, it would be beneficial to collect data at different time points in order to better understand the developmental pathways that lead to the different subtypes of aggression. By shedding light on possible transactional processes surrounding aggression, research will be better able to establish causal direction and examine change over time, which in turn would inform clinical practice. In addition to using a longitudinal design, it would also be beneficial to collect data in a clinical sample to capture a larger proportion of individuals that score high on the subtypes of aggression.

It would also be beneficial for future researchers to expand on the age group of the current study by including older adolescents in the sample. Given that adolescence can be a particularly tumultuous time between parents and adolescents, it would be interesting to see if the parent-child attachment relationship still plays a significant role or if their attachment relationship with their peers is more influential in predicting aggressive behaviour. Previous research has suggested that during adolescence, attachment to peers becomes more important than attachment to parents (Liable, Carlo, & Raffaelli, 2000; Weiss, 1991). For this reason, it would be beneficial to measure attachment to parents, as well as their attachment to peers, to determine if there is a measureable difference between the two attachment sources or if one seems to be a more significant predictor of different forms and functions of aggressive behaviour.

Additionally, future research could include other significant informants, such as a second caregiver (i.e., father) or a teacher at school, in order to create a more well-rounded perspective on the variables in question. Due to the social desirability bias that surrounds questions that may place participants in a negative light (i.e., high aggression or low attachment security), having multiple informants may help reduce some of this inherent bias.

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*Appendix A*, Ethics Clearance

**Brock University**
Research Ethics Office
Tel: 905-688-5550 ext. 3035
Email: reb@brocku.ca

Social Science Research Board
Certificate of Ethics Clearance for Human Participant Research

DATE: 4/16/2012
PRINCIPAL INVESTIGATOR: DANE, Drew - Psychology
FILE: 11-218 - DANE
TYPE: Faculty Research

TITLE: Brock-YMCA Child and Family Development Study

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**ETHICS CLEARANCE GRANTED**

Type of Clearance: NEW Expiry Date: 4/30/2013

The Brock University Social Sciences Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 4/16/2012 to 4/30/2013.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 4/30/2013. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page at http://www.brocku.ca/research/policies-and-forms/research-forms.

In addition, throughout your research, you must report promptly to the REB:

a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
c) New information that may adversely affect the safety of the participants or the conduct of the study;
d) Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved:

_____
Jan Frijters, Chair
Social Sciences Research Ethics Board

## *Appendix B,* Demographics Questionnaire

| PART A | **Let's begin with some information about you and your child who is completing the youth survey. IF YOU HAVE MORE THAN ONE CHILD AT THIS SCHOOL, PLEASE ANSWER THE QUESTIONS WITH RESPECT TO THE CHILD WHO BROUGHT THIS SURVEY HOME.** |
|---|---|

1. What is your relationship to the child who is completing the youth survey (i.e., mother, stepmother, etc.)?

   Please specify: _____

2. How often does the child completing the survey live in your household (i.e., always, weekends, holidays, etc.)?

   Please specify: _____

3. What grade is the child completing the survey in? Grade: _____

4. Is the child completing the survey a boy or a girl? Please circle your answer. Boy Girl

5. How old is the child completing the survey? _____ years old.

6. What is the height _____and weight _____of the child completing the survey?

7. How many other children do you have? _____

8. Who resides in your household (i.e., father, stepmother, 2 children…)?

   Please specify: _____

9. What is your age? _____ years old

10. What is your marital status? Please indicate your response by checking the appropriate answer box.

    ☐ Single, never married ☐ Common-law / living together ☐ Widowed
    ☐ Married ☐ Divorced or separated ☐ Other: _____
    ☐ Re-married

11. Other than Canadian, is there another ethnic or cultural group(s) that your family belongs to?

    ☐ No ☐ Yes ⟹ If YES please specify: _____

12. What languages are spoken in your home? _____

13. Where were you born? _____

14. What is the highest level of education that you have completed? Please indicate your response by checking the appropriate answer box

    ☐ Primary ☐ College ☐ Master's Degree
    ☐ Elementary ☐ University ☐ Doctoral Degree
    ☐ High School

15. What is your main occupation? Please check your answer.

    ☐ Employed full-time ☐ Unemployed or looking for work ☐ Retired

☐ Employed part-time ☐ Student ☐ Other:_____

☐ Stay at home parent

16. What was your total household income, before taxes, last year (from all persons in your household)? Please check your answer.

☐ Under $20,000
☐ $20,000-30,000
☐ $30,000-40,000
☐ $40,000-50,000
☐ $50,000-60,000
☐ $60,000-70,000
☐ $70,000-80,000
☐ $80,000-90,000
☐ $100,000-120,000
☐ More than $120,000

## *Appendix C*, Peer Conflict Scale

How TRUE is each statement for you?

| | | NOT AT ALL TRUE | HARDLY EVER TRUE | SOMEWHAT TRUE | DEFINITELY TRUE |
|---|---|---|---|---|---|
| 1 | I have hurt others to win a game or contest | 1 | 2 | 3 | 4 |
| 2 | I enjoy making fun of others | 1 | 2 | 3 | 4 |
| 3 | When I am teased, I will hurt someone or break something | 1 | 2 | 3 | 4 |
| 4 | Sometimes I gossip about others when I'm angry at them | 1 | 2 | 3 | 4 |
| 5 | I start fights to get what I want | 1 | 2 | 3 | 4 |
| 6 | I deliberately exclude others from my group, even if they haven't done anything to me | 1 | 2 | 3 | 4 |
| 7 | I spread rumors and lies about others when they do something wrong to me | 1 | 2 | 3 | 4 |
| 8 | When someone hurts me, I end up getting into a fight | 1 | 2 | 3 | 4 |
| 9 | I try to make others look bad to get what I want | 1 | 2 | 3 | 4 |
| 10 | When someone upsets me, I tell my friends to stop liking that person | 1 | 2 | 3 | 4 |
| 11 | I threaten others when they do something wrong to me | 1 | 2 | 3 | 4 |
| 12 | When I hurt others, I feel like it makes me powerful and respected | 1 | 2 | 3 | 4 |
| 13 | I tell others' secrets for things they did to me a while back | 1 | 2 | 3 | 4 |
| 14 | When someone threatens me, I end up getting into a fight | 1 | 2 | 3 | 4 |
| 15 | I make new friends to get back at someone who has made me angry | 1 | 2 | 3 | 4 |
| 16 | Sometimes I hurt others when I'm angry at them | 1 | 2 | 3 | 4 |
| 17 | When others make me mad, I write mean notes about them and pass them around | 1 | 2 | 3 | 4 |
| 18 | I threaten others to get what I want | 1 | 2 | 3 | 4 |
| 19 | I gossip about others to become popular | 1 | 2 | 3 | 4 |
| 20 | If others make me mad, I hurt them | 1 | 2 | 3 | 4 |
| 21 | I am deliberately cruel to others, even if they haven't done anything to me | 1 | 2 | 3 | 4 |
| 22 | When I am angry at others, I try to make them look bad | 1 | 2 | 3 | 4 |
| 23 | To get what I want, I try to steal others' friends from them | 1 | 2 | 3 | 4 |
| 24 | I carefully plan out how to hurt others | 1 | 2 | 3 | 4 |
| 25 | When someone makes me mad, I throw things at them | 1 | 2 | 3 | 4 |
| 26 | When I gossip about others, I feel like it makes me popular | 1 | 2 | 3 | 4 |
| 27 | I hurt others for things they did to me a while back | 1 | 2 | 3 | 4 |
| 28 | I enjoy hurting others | 1 | 2 | 3 | 4 |
| 29 | I spread rumors and lies about others to get what I want | 1 | 2 | 3 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| 30 | Most of the times that I have gotten into arguments or physical fights, I acted without thinking | 1 | 2 | 3 | 4 |
| 31 | If others make me mad, I tell their secrets | 1 | 2 | 3 | 4 |
| 32 | I ignore or stop talking to others in order to get them to do what I want | 1 | 2 | 3 | 4 |
| 33 | I like to hurt kids smaller than me | 1 | 2 | 3 | 4 |
| 34 | When others make me angry, I try to steal their friends from them | 1 | 2 | 3 | 4 |
| 35 | I threaten others, even if they haven't done anything to me | 1 | 2 | 3 | 4 |
| 36 | When I get angry, I will hurt someone | 1 | 2 | 3 | 4 |
| 37 | I have gotten into fights, even over small insults from others | 1 | 2 | 3 | 4 |
| 38 | Most of the times that I have started rumors about someone, I acted without thinking | 1 | 2 | 3 | 4 |
| 39 | I say mean things about others, even if they haven't done anything to me | 1 | 2 | 3 | 4 |
| 40 | When someone makes me angry, I try to exclude them from my group | 1 | 2 | 3 | 4 |

*Appendix D*, Early Adolescent Temperament Questionnaire Revised

| PART G | **For each statement, please circle the answer which best describes how true each statement is for your child.** |
|---|---|

| | **Your son or daughter….** | **Almost always untrue** | **Usually untrue** | **Sometimes true, sometimes untrue** | **Usually true** | **Almost always true** |
|---|---|---|---|---|---|---|
| **1** | Worries about getting into trouble. | 1 | 2 | 3 | 4 | 5 |
| **2** | Has a hard time finishing things on time. | 1 | 2 | 3 | 4 | 5 |
| **3** | Thinks traveling to Africa or India would be exciting and fun. | 1 | 2 | 3 | 4 | 5 |
| **4** | If having a problem with someone, usually tries to deal with it right away. | 1 | 2 | 3 | 4 | 5 |
| **5** | Has a hard time waiting his/her turn to speak when excited. | 1 | 2 | 3 | 4 | 5 |
| **6** | Opens presents before s/he is supposed to. | 1 | 2 | 3 | 4 | 5 |
| **7** | Would be frightened by the thought of skiing fast down a steep slope. | 1 | 2 | 3 | 4 | 5 |
| **8** | Likes taking care of other people. | 1 | 2 | 3 | 4 | 5 |
| **9** | Likes to be able to share his/her private thoughts with someone else. | 1 | 2 | 3 | 4 | 5 |
| **10** | Usually does something fun for awhile before starting her/his homework, even though s/he is not supposed to. | 1 | 2 | 3 | 4 | 5 |
| **11** | Finds it easy to really concentrate on a problem. | 1 | 2 | 3 | 4 | 5 |
| **12** | Thinks it would be exciting to move to a new city. | 1 | 2 | 3 | 4 | 5 |
| **13** | When asked to do something, does it right away, even if s/he doesn't want to. | 1 | 2 | 3 | 4 | 5 |
| **14** | Would like to be able to spend time with a good friend every day. | 1 | 2 | 3 | 4 | 5 |
| **15** | Is annoyed by little things other kids do. | 1 | 2 | 3 | 4 | 5 |
| **16** | Gets very irritated when someone criticizes her/him. | 1 | 2 | 3 | 4 | 5 |
| **17** | When interrupted or distracted, forgets what s/he was about to say. | 1 | 2 | 3 | 4 | 5 |
| **18** | Is more likely to do something s/he shouldn't do the more s/he tries to stop her/himself. | 1 | 2 | 3 | 4 | 5 |
| **19** | Enjoys exchanging hugs with people s/he likes. | 1 | 2 | 3 | 4 | 5 |
| **20** | Tends to try to blame mistakes on someone else. | 1 | 2 | 3 | 4 | 5 |
| **21** | Can generally think of something to say, even with strangers. | 1 | 2 | 3 | 4 | 5 |
| **22** | Wouldn't be afraid to try a risky sport like deep sea diving. | 1 | 2 | 3 | 4 | 5 |
| **23** | Expresses a desire to travel to exotic places when s/he hears about them. | 1 | 2 | 3 | 4 | 5 |
| **24** | Worries about our family when s/he is not with us. | 1 | 2 | 3 | 4 | 5 |
| **25** | Gets irritated when I will not take her/him someplace s/he wants to go. | 1 | 2 | 3 | 4 | 5 |
| **26** | Would like driving a racing car. | 1 | 2 | 3 | 4 | 5 |
| **27** | Has a difficult time tuning out background noise and concentrating when trying to study. | 1 | 2 | 3 | 4 | 5 |
| **28** | Usually finishes her/his homework before it’s due. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **29** | Likes it when something exciting and different happens at school. | 1 | 2 | 3 | 4 | 5 |
| **30** | Usually gets started right away on difficult assignments. | 1 | 2 | 3 | 4 | 5 |
| **31** | Is good at keeping track of several different things that are happening around her/him. | 1 | 2 | 3 | 4 | 5 |
| **32** | Is energized by being in large crowds of people. | 1 | 2 | 3 | 4 | 5 |
| **33** | Wants to have close relationships with other people. | 1 | 2 | 3 | 4 | 5 |
| **34** | Is shy. | 1 | 2 | 3 | 4 | 5 |
| **35** | Gets irritated when s/he has to stop doing something s/he is enjoying. | 1 | 2 | 3 | 4 | 5 |
| **36** | Usually puts off working on a project until it is due. | 1 | 2 | 3 | 4 | 5 |
| **37** | Is able to stop him/herself from laughing at inappropriate times. | 1 | 2 | 3 | 4 | 5 |
| **38** | Is afraid of the idea of me dying or leaving her/him. | 1 | 2 | 3 | 4 | 5 |
| **39** | Is often in the middle of doing one thing and then goes off to do something else without finishing it. | 1 | 2 | 3 | 4 | 5 |
| **40** | Is not shy. | 1 | 2 | 3 | 4 | 5 |
| **41** | Is quite a warm and friendly person. | 1 | 2 | 3 | 4 | 5 |
| **42** | Doesn't enjoy playing softball or baseball because s/he is afraid of the ball. | 1 | 2 | 3 | 4 | 5 |
| **43** | Likes meeting new people. | 1 | 2 | 3 | 4 | 5 |
| **44** | Feels scared when entering a darkened room at night. | 1 | 2 | 3 | 4 | 5 |
| **45** | Wouldn't want to go on the frightening rides at the fair. | 1 | 2 | 3 | 4 | 5 |
| **46** | Hates it when people don't agree with him/her. | 1 | 2 | 3 | 4 | 5 |
| **47** | Gets very frustrated when s/he makes a mistake in her/his school work. | 1 | 2 | 3 | 4 | 5 |
| **48** | Is usually able to stick with his/her plans and goals. | 1 | 2 | 3 | 4 | 5 |
| **49** | Pays close attention when someone tells her/him how to do something. | 1 | 2 | 3 | 4 | 5 |
| **50** | Is nervous being home alone. | 1 | 2 | 3 | 4 | 5 |
| **51** | Feels shy about meeting new people. | 1 | 2 | 3 | 4 | 5 |

## *Appendix E*, Inventory of Parent and Peer Attachment Scale

Please circle the answer that best describes your relationship with your parents/stepparents/guardians with whom you live the most.

| | | ALMOST NEVER OR NEVER TRUE | HARDLY EVER TRUE | SOMETIMES TRUE | OFTEN TRUE | ALMOST ALWAYS OR ALWAYS TRUE |
|---|---|---|---|---|---|---|
| 1 | My parents respect my feelings | 1 | 2 | 3 | 4 | 5 |
| 2 | My parents are good parents. | 1 | 2 | 3 | 4 | 5 |
| 3 | I wish I had different parents. | 1 | 2 | 3 | 4 | 5 |
| 4 | My parents accept me as I am. | 1 | 2 | 3 | 4 | 5 |
| 5 | I can depend on my parents to help me solve a problem. | 1 | 2 | 3 | 4 | 5 |
| 6 | I like to get my parents' view on things I'm worried about. | 1 | 2 | 3 | 4 | 5 |
| 7 | It helps to show my feelings when I'm upset. | 1 | 2 | 3 | 4 | 5 |
| 8 | My parents can tell when I'm upset about something. | 1 | 2 | 3 | 4 | 5 |
| 9 | I feel silly or ashamed when I talk about my problems with my parents. | 1 | 2 | 3 | 4 | 5 |
| 10 | My parents expect too much from me. | 1 | 2 | 3 | 4 | 5 |
| 11 | I easily get upset at home. | 1 | 2 | 3 | 4 | 5 |
| 12 | I get upset a lot more than my parents know about. | 1 | 2 | 3 | 4 | 5 |
| 13 | When I talk about things with my parents they listen to what I think. | 1 | 2 | 3 | 4 | 5 |
| 14 | My parents listen to my opinions. | 1 | 2 | 3 | 4 | 5 |
| 15 | My parents have their own problems, so I don't bother them with mine. | 1 | 2 | 3 | 4 | 5 |
| 16 | My parents help me to understand myself better. | 1 | 2 | 3 | 4 | 5 |
| 17 | I tell my parents about my problems and troubles. | 1 | 2 | 3 | 4 | 5 |
| 18 | I feel angry with my parents. | 1 | 2 | 3 | 4 | 5 |
| 19 | I don't get much attention at home. | 1 | 2 | 3 | 4 | 5 |
| 20 | My parents support me to talk about my worries. | 1 | 2 | 3 | 4 | 5 |
| 21 | My parents understand me. | 1 | 2 | 3 | 4 | 5 |
| 22 | I don't know who I can depend on. | 1 | 2 | 3 | 4 | 5 |
| 23 | When I am angry about something, my parents try to understand. | 1 | 2 | 3 | 4 | 5 |
| 24 | I trust my parents. | 1 | 2 | 3 | 4 | 5 |
| 25 | My parents understand my problems. | 1 | 2 | 3 | 4 | 5 |
| 26 | I can count on my parents when I need to talk about a problem. | 1 | 2 | 3 | 4 | 5 |
| 27 | No one understands me. | 1 | 2 | 3 | 4 | 5 |
| 28 | If my parents know that I am upset about something, they ask me about it. | 1 | 2 | 3 | 4 | 5 |